S. HRG. 99-707, PT. 3

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT, AND CERTAIN INDEPENDENT AGENCIES APPROPRIATIONS FOR FISCAL YEAR 1987

HEARINGS

BEFORE A

SUBCOMMITTEE OF THE

COMMITTEE ON APPROPRIATIONS

UNITED STATES SENATE

NINETY-NINTH CONGRESS

SECOND SESSION

ON

H.R. 5313

AN ACT MAKING APPROPRIATIONS FOR THE DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT, AND FOR SUNDRY INDEPENDENT AGENCIES, BOARDS, COMMISSIONS, CORPORATIONS, AND OFFICES FOR THE FISCAL YEAR ENDING SEPTEMBER 30, 1987, AND FOR OTHER PURPOSES

PART 3—(Pages 1027-1832)

NONDEPARTMENTAL WITNESSES

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DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT-INDEPENDENT AGENCIES APPROPRIATIONS FOR FISCAL YEAR 1987

TUESDAY, APRIL 29, 1986

U.S. SENATE,
SUBCOMMITTEE OF THE COMMITTEE ON APPROPRIATIONS,
Washington, DC.

The subcommittee met in room SD-124, Dirksen Senate Office Building, Hon. Jake Garn (chairman) presiding.

Present: Senators Garn, D'Amato, and Lautenberg.

NONDEPARTMENTAL WITNESSES

Senator GARN. The subcommittee will come to order.

This morning, we will begin hearing the first of 2 days of public witness testimony. This year, we began hearing testimony from the 19 agencies and commissions under the jurisdiction of this committee on February 18 and plan to conduct future agency hearings prior to our deliberative process.

As a result of these hearings, we have built a record as to the administration's policy and budget on literally hundreds of programs.

Between now and tomorrow evening, we will hear from over 60 individuals and organizations who are taking their time to share their thoughts on how these programs might be improved. I certainly hope we can increase the program benefits while curtailing the program costs. These hearings have been particularly valuable to us in the past and I am looking forward to the insights that the witnesses will provide over the next 2 days.

In order that we might follow our schedule, I will have to ask each witness to confine their presentation to 5 minutes. I am sure that is understandable with 60 witnesses, and certainly we will be willing to place everyone's entire testimony in the record.

Before beginning, I certainly wish to thank Cathy Gosweiler of the subcommittee staff for the amazing work she does in scheduling all of the subcommittee meetings, and particularly when we have the public witnesses.

I would like to call as our first witness James Magill of the Veterans of Foreign Wars.

Before I turn to you, Mr. McGill, I would like to turn to Senator D'Amato for any comments he would like to make.

STATEMENT OF HON. ALFONSE M. D'AMATO, U.S. SENATOR FROM NEW YORK

Senator D'AMATO. Mr. Chairman, I have a statement I would like to include in the record as if read in its entirety. At this time I would like to commend the chairman for the strength of character and purposefulness which he will have to demonstrate in listening to 60 different individual presentations from 60 different agencies.

Senator GARN. You don't give the chairman enough credit. I have got other Senators to chair parts of the hearing.

Senator D'AMATO. Well, I see, but I still give the chairman credit for inducing his other colleagues to chair those hearings.

But, let me also say that this Senator is deeply appreciative of the sensitivity that the chairman has displayed as it relates to a whole host of programs, such as senior citizen housing, urban development action grants, and various programs that have been of particular importance to the people of my State. I am deeply appreciative. I just wanted to share that with you, for the record.

Senator GARN. Thank you very much, Senator.

[The statement follows:]

STATEMENT OF SENATOR D'AMATO

MR. CHAIRMAN, I AM PLEASED TO JOIN YOU FOR THE PUBLIC WITNESS TESTIMONY ON FY 87 APPROPRIATIONS FOR THE U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT, VETERANS ADMINISTRATION, AND THE ENVIRONMENTAL PROTECTION AGENCY.

THE U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT HAS BEEN INSTRUMENTAL IN PROVIDING SAFE, DECENT, AND AFFORDABLE HOUSING FOR OUR CITIZENRY. THE NEED FOR SUCH HOUSING AND COMMUNITY DEVELOPMENT ASSISTANCE STILL EXISTS.

HUD'S PROPOSED FY 87 BUDGET REDUCTION, ALONG WITH THE PROPOSED DEFERRAL AND RECISSION OF FUNDING FOR FISCAL YEAR 1986 PROGRAMS, WILL NOT ADVANCE OUR NATIONAL HOUSING POLICY. PROGRAMS THAT HAVE PROVIDED INVALUABLE ASSISTANCE TO OUR ELDERLY, TO THE HANDICAPPED, AND FOR THE BETTERMENT OF OUR COMMUNITIES WOULD BE TERMINATED FOR FY 87 AND GREATLY REDUCED FOR FY 86. PROGRAMS THAT TOOK YEARS TO DEVELOP FOR THE REVITALIZATION AND RENOVATION OF OUR COMMUNITIES ARE BEING DISMANTLED. CITIZENS -- EVEN COMMUNITY LEADERS AND OFFICIALS -- DO NOT UNDERSTAND THESE ACTIONS, THEY HAVE NOT HAD TIME TO PREPARE, AND MANY WILL BE UNABLE TO SURVIVE THE TERMINATION OF ASSISTANCE.

IN ORDER FOR OUR COMMUNITIES TO SURVIVE, THE FEDERAL GOVERNMENT MUST CONTINUE TO PLAY AN IMPORTANT ROLE IN PROMOTING PROGRAMS OF ASSISTANCE. FOR EXAMPLE, URBAN DEVELOPMENT ACTION GRANTS ASSIST CITIES AND URBAN COUNTIES EXPERIENCING SEVERE ECONOMIC DISTRESS. THEY STIMULATE ECONOMIC DEVELOPMENT ACTIVITY NEEDED TO AID IN LOCAL ECONOMIC

RECOVERY. THIS IS DONE THROUGH A COMBINATION OF PUBLIC AND PRIVATE INVESTMENT IN ECONOMIC DEVELOPMENT PROJECTS.

NATIONWIDE, THE URBAN DEVELOPMENT ACTION GRANT PROGRAM HAS CREATED MORE THAN 513,000 NEW, PERMANENT JOBS, 429,000 CONSTRUCTION JOBS, AND HAS RETAINED MORE THAN 124,000 JOBS. UDAGS, TOTALLING MORE THAN $3.9 BILLION, HAVE CREATED AT LEAST $23 BILLION IN PRIVATE INVESTMENTS. AS A RESULT OF THIS PROGRAM, AN ADDITIONAL $521 MILLION HAS BEEN RAISED IN PROPERTY TAXES AND OTHER LOCAL TAXES. UDAGS HAVE ASSISTED IN MORE THAN 2,400 DEVELOPMENT PROJECTS IN OVER 1,084 CITIES.

BETWEEN 1981 AND 1985, NEW YORK RECEIVED 277 UDAG GRANTS TOTALLING $436 MILLION. THIS CREATED PRIVATE INVESTMENT OF MORE THAN $1.8 BILLION AND MORE THAN 45,844 JOBS IN NEW YORK STATE.

COMMUNITY DEVELOPMENT BLOCK GRANTS ALSO ASSIST IN THE DEVELOPMENT OF OUR COMMUNITIES, BUT HUD IS DEFERRING $500 MILLION OF THE FY 86 APPROPRIATION. THIS 14% REDUCTION IN ASSISTANCE WOULD PROVE HARMFUL TO COMMUNITIES IN NEW YORK AND THROUGHOUT THE COUNTRY. MANY OF THESE COMMUNITIES WERE ANTICIPATING ASSISTANCE, BUT HAVE BEEN TOLD THAT THEY WILL NOT BE RECEIVING IT.

A WIDE RANGE OF PHYSICAL, ECONOMIC, AND SOCIAL DEVELOPMENT ACTIVITIES ARE ELIGIBLE FOR FUNDING UNDER THE CDBG PROGRAM. ACQUISITION AND DISPOSITION OF REAL PROPERTY, CONSTRUCTION OF PUBLIC FACILITIES PROJECTS, AND REHABILITATION OF HOUSING AND BUSINESS PROPERTIES ARE ALSO ELIGIBLE ACTIVITIES UNDER THE CDBG PROGRAM. ECONOMIC

DEVELOPMENT ASSISTANCE AND PROVISIONS FOR A VARIETY OF PUBLIC SERVICES THAT ARE VITALLY IMPORTANT LOCAL PRIORITIES ALSO ARE FUNDED UNDER THIS PROGRAM.

BETWEEN 1981 AND 1985, NEW YORK RECEIVED $1.9 BILLION IN CDBG ASSISTANCE. IN 1985 ALONE, NEW YORK STATE RECEIVED $370 MILLION UNDER THE CDBG ENTITLEMENT PROGRAM. IN ADDITION, 97 NEW YORK COMMUNITIES RECEIVED MORE THAN $41 MILLION UNDER THE SMALL CITIES PROGRAM.

CDBG FUNDS HAVE ASSISTED IN A VARIETY OF PROJECTS THROUGHOUT NEW YORK. IN ANDOVER, CDBG FUNDS ASSISTED IN THE REPLACEMENT OF MALFUNCTIONING ON-SITE SEWAGE DISPOSAL SYSTEMS TO PREVENT HEALTH HAZARDS; THE REHABILITATION OF SUBSTANDARD HOUSING UNITS THROUGH A PROGRAM OF LOANS AND GRANTS WAS PROVIDED IN NEW BERLIN; CLINTON USED ITS FUNDS FOR THE CONSTRUCTION OF A 20,000-SQUARE-FOOT STRUCTURE IN AN INDUSTRIAL PARK THAT WILL BE SUBDIVIDED AND USED AS AN "INCUBATOR" FOR NEW BUSINESS ENTERPRISE; CROWN POINT IS ABLE TO ESTABLISH AN INVESTOR-OWNER HOUSING REHABILITATION PROGRAM DESIGNED TO ASSIST IN THE REPAIR OF HOUSING UNITS; FRANKFORT WILL REHABILITATE THEIR MUNICIPAL WATER SYSTEM; FULTON COUNTY WILL USE THEIR FUNDS FOR THE DEVELOPMENT OF A REVOLVING LOAN FUND TO FINANCE SIX ECONOMIC EXPANSION PROJECTS; AND NEWBURGH DEVELOPED A COMPREHENSIVE ECONOMIC JOB CREATION EFFORT WITH THEIR CDBG FUNDS. NEWBURGH COMBINED COMMUNITY DEVELOPMENT BLOCK GRANT FUNDS WITH URBAN DEVELOPMENT ACTION GRANT FUNDS TO CREATE 755 NEW JOBS.

THESE ARE JUST A FEW OF THE OUTSTANDING EXAMPLES OF ECONOMIC DEVELOPMENT AND JOB CREATION THAT I COULD CITE. EACH EXEMPLIFIES THE IDEA BEHIND THE CREATION OF THE CDBG PROGRAM.

CDBG ACTIVITIES ARE OFTEN PLANNED OVER A EXTENSIVE PERIOD OF TIME. COMMUNITIES DO THE PLANNING AND DEVELOPMENT WITH A CERTAIN ALLOCATION IN MIND. IF THEIR ALLOCATION IS REDUCED BY 14%, THEY HAVE TO MAKE MAJOR CHANGES AND DELETIONS IN THEIR PLANS. THIS WAS NOT THE INTENT OF CONGRESS FOR THE COMMUNITY DEVELOPMENT BLOCK GRANT PROGRAM FOR FISCAL YEAR 1986.

THE SENATE AND HOUSE AGREED TO ALLOCATE $3.1 BILLION FOR THE CDBG PROGRAM IN 1986. A REDUCTION OF $500 MILLION WOULD END MANY PROGRAMS PLANNED FOR, AND BY, OUR COMMUNITIES. MAYORS AND OTHER LOCAL OFFICIALS IN NEW YORK STATE, AS WELL AS AROUND THE COUNTRY, HAVE SAID THAT A DEFERRAL OF $500 MILLION WOULD POSE AN UNDUE HARDSHIP. COMMUNITY OFFICIALS HAVE PLANNED A VARIETY OF ACTIVITIES, BUT NOW MUST TELL THEIR CITIZENS THAT THE FUNDS FOR DEVELOPMENT, RESTORATION, AND OTHER ACTIVITIES ARE NO LONGER AVAILABLE. THIS IS NOT WHAT CONGRESS INTENDED.

ANOTHER PROGRAM THAT BENEFITS OUR CITIZENRY, ESPECIALLY THE ELDERLY AND HANDICAPPED, IS THE SECTION 202 PROGRAM. THE ELDERLY AND HANDICAPPED GREATLY DEPEND UPON THIS PROGRAM FOR SAFE AND DECENT SHELTER. IN FACT, BETWEEN 1981 AND 1985, NEW YORK RECEIVED 117 SECTION 202 AWARDS FOR 6,465 UNITS. THIS ASSISTANCE FOR OUR SENIORS PROVIDED FUNDING OF MORE THAN $334 MILLION.

HUD'S RECISSION/DEFERRAL OF HOUSING AND COMMUNITY DEVELOPMENT PROGRAMS WOULD HAVE POSED AN UNDUE HARDSHIP ON OUR COMMUNITIES. THEREFORE, I AM PLEASED THAT FUNDS FOR MANY OF THESE PROGRAMS WERE RECENTLY REINSTATED. OUR COMMUNITIES

SHOULD KNOW WHAT TO EXPECT OR WHAT HUD'S INTENTIONS ARE FOR THE REMAINDER OF THIS YEAR. RECISSIONS AND DEFERRALS DO NOT PERMIT THIS.

AS A STRONG SUPPORTER OF SERVICES FOR OUR VETERANS, I AM PLEASED THAT THE VETERANS COMPENSATION AND PENSION PROGRAMS, AS WELL AS A PORTION OF MEDICAL CARE SERVICES, ARE ENTIRELY EXEMPT FROM SEQUESTRATION. IN ADDITION, THE VA BUDGET HAS INCREASED SLIGHTLY IN THE PRESIDENT'S 1987 BUDGET TO $26.6 BILLION. I AM ENCOURAGED BY THE GENERAL SUPPORT THAT VETERAN PROGRAMS ARE RECEIVING.

THE PRESIDENT'S PACKAGE PROPOSES TWO MAJOR CHANGES TO BETTER DIRECT VETERANS BENEFITS TO SERVICE-CONNECTED AND LOW-INCOME VETERANS. ONE OF THESE WILL REFORM MEDICAL ELIGIBILITY REQUIREMENTS TO MAINTAIN MEDICAL BENEFITS FOR VETERANS WITH SERVICE-CONNECTED DISABILITIES AND LOW INCOMES. THE OTHER WILL RESTRUCTURE THE VA'S LONG-TERM CARE PROGRAM TO MAKE THE BEST USE OF VA RESOURCES TO MEET THE NEEDS FO VETERANS THAT REQUIRE LONG-TERM CARE SERVICES.

I ALSO APPRECIATE THE OPPORTUNITY TO COMMENT BRIEFLY ON SOME OF THE ENVIRONMENTAL PROGRAMS TO BE DISCUSSED TODAY. I AM PLEASED TO SEE JOHN MANNION FROM THE AMERICAN WATER WORKS ASSOCIATION RESEARCH FOUNDATION WITH US TO REPORT ON THE PROGRESS OF THE FOUNDATION. THIS IS A PROGRAM I HAVE GLADLY SUPPORTED. IT IS AN EXCELLENT EXAMPLE OF A FEDERAL-INDUSTRY COOPERATIVE PROGRAM.

I SHARE THE CONCERNS THAT SOME OF OUR WITNESSES TODAY WILL EXPRESS IN TERMS OF OTHER EPA PROGRAMS. IT IS IMPOSSIBLE TO REALLY CONSIDER SOME OF THESE FUNDING ISSUES

WITHOUT ACKNOWLEDGING THE URGENT NEED FOR THE CONGRESS TO COMPLETE ACTION ON SEVERAL MAJOR PIECES OF ENVIRONMENTAL LEGISLATION. ONE OF THE MOST CRITICAL NEEDS WE WILL DISCUSS TODAY IS CURRENTLY BEFORE THE CLEAN WATER CONFERENCE -- THE NEED TO ENSURE THE CONTINUATION OF THE EPA CONSTRUCTION GRANTS PROGRAM AT A LEVEL WHICH WILL ENSURE THE ABILITY OF OUR LOCAL GOVERNMENTS TO COMPLY WITH THE CLEAN WATER GOALS SET BY CONGRESS.

ANOTHER CONCERN I EXPRESSED TO MR. THOMAS WHEN HE APPEARED BEFORE THIS SUBCOMMITTEE RECENTLY WAS THE URGENT NEED FOR A FIVE-YEAR SUPERFUND PROGRAM REAUTHORIZATION. SINCE THAT TIME, WE HAVE PASSED AN INTERIM FUNDING MEASURE. THIS WAS NECESSARY TO AVOID AN IMMEDIATE CRISIS, BUT IT IS NOT A LONG-TERM SOLUTION. I SINCERELY HOPE THAT WE WILL SEE THE CONFERENCE COMMITTEE RESOLVE THEIR DIFFERENCES AND REPORT A STRONG SUPERFUND BEFORE THE NEED FOR ANOTHER INTERIM FUNDING MEASURE BECOMES A REALITY.

I ALSO WANT TO REITERATE MY SUPPORT FOR A CONTINUED COMMITMENT TO THE GREAT LAKES PROGRAM AND THE ESTUARINE PROGRAM FOR WATER QUALITY MANAGEMENT IN FOUR IMPORTANT COASTAL WATER BODIES, INCLUDING LONG ISLAND SOUND.

WE ALL SHARE IN THE DESIRE FOR COMMUNITIES THAT ARE SAFE, DECENT, AND PROSPEROUS. THE FY 87 APPROPRIATIONS FOR PROGRAMS OF THE U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT, VETERANS ADMINISTRATION, AND THE ENVIRONMENTAL PROTECTION ACGENCY SHOULD PROMOTE THIS DREAM. IN FACT, IT SHOULD SERVE AS AN INCENTIVE FOR THE MANY PROGRAMS THAT BENEFIT OUR FAMILIES, COMMUNITIES, AND CITIES FOR THIS FISCAL YEAR AND THOSE TO FOLLOW. YOUR COMMENTS AND SUGGESTIONS TODAY WILL HELP US DO JUST THAT.

THANK YOU, MR. CHAIRMAN

VETERANS ADMINISTRATION

STATEMENT OF JAMES N. MAGILL, DIRECTOR, NATIONAL LEGISLATIVE SERVICE, VETERANS OF FOREIGN WARS OF THE UNITED STATES

Senator GARN. First, we have James Magill, director, National Legislative Service, Veterans of Foreign Wars of the United States. We're happy to have you with us this morning. Please proceed.

Mr. MAGILL. Mr. Chairman, thank you for the privilege of appearing before this distinguished subcommittee to present the views of the more than 2 million men and women of the Veterans of Foreign Wars of the United States.

As you know, the budget for the Veterans Administration has not been yet established. At this point, there is no way of knowing what dollar amounts will be agreed upon by the Congress and the President.

We do know, however, those areas where serious consideration is being given, making very deep cuts in veterans benefits, entitlements and, in general, the VA's ability to serve its constituency.

Mr. Chairman, the budget proposed by the President for the Veterans Administration represents a decrease of $408 million from the current fiscal year.

According to the administration, on September 30, 1985, there were approximately 27.8 million veterans, 49.4 million family members of living veterans, and 2.1 million survivors of deceased veterans. It should also be noted that the population's life expectancy is rising. As a result, the Veterans Administration is on the threshhold of having to accept new challenges in providing benefits and entitlements to those eligibles.

It is for these reasons that the VFW finds that the proposed fiscal year 1987 VA budget severely lacking in the basic funding levels to provide for this challenge and to preserve the integrity of the total VA system.

The House and Senate Veterans Affairs Committee, as well as the Senate Budget Committee, also agree with our assessment of the President's recommendations. They, too, believe the President's request is too small and in each case these committees have recommended a higher amount.

We believe the President's proposal takes direct aim at undermining the integrity of the VA's ability to provide adequate health care to our Nation's veterans.

Outlays for fiscal year 1987 medical care programs would be $102.4 million less than provided for in fiscal year 1986. Existing care staff would be cut by nearly 8,000 personnel. This is in addition to the $120.4 million and the 1,340 personnel reductions just recently placed into effect as a result of Gramm-Rudman-Hollings.

This means that a grand total of over 1,300 nurses and almost 500 physicians will not be in VA hospitals, caring for the increasing patient load. This budget proposal requires that 57,354 fewer veterans receive in patient treatment from the VA and also imposes a further reduction of $1.1 million in out patient visits during fiscal year 1987.

By the VA's estimate, up to 37,000 veterans are already being turned away each month from VA health care facilities.

At a time when the administration is voicing its concern about the aging veteran and its obligation to provide extended care, we find it curious the budget proposal does not properly address this concern. In fact, the VA proposes to reduce it's present 40-percent share of nursing home beds 30 percent.

I would certainly commend the VA's attempt to address this problem by initiating the conversion of a portion of their acute care beds to long-term care beds, we believe greater emphasis should be placed on the nursing area.

They are also concerned about the decrease in major construction projects, five projects a year to two. At this rate, it appears the VA will have a very difficult time in providing modern facilities for their acute and long-term care responsibilities. The VFW believes it is essential to initiate an aggressive modernization renovation and replacement program inasmuch as 53 percent of the VA's beds are housed in buildings over 30 years old.

Mr. Chairman, we hope you and your subcommittee will take into consideration our concerns with the administration's proposed budget for fiscal year 1987. we realize there is a responsibility to cut spending, but at the same time we also firmly believe this Nation has a responsibility to care for her veterans. This concludes my presentation.

At this time I will be happy to respond to any questions.

Senator GARN. Thank you, Mr. Magill.

[The statement follows:]

STATEMENT OF JAMES N. MAGILL, DIRECTOR, NATIONAL LEGISLATIVE SERVICE, VETERANS OF FOREIGN WARS OF THE UNITED STATES

Mr. Chairman and members of the Subcommittee, thank you for the privilege of appearing before this distinguished Subcommittee to present the views of the more than two million men and women of the Veterans of Foreign Wars of the United States. In order to be consistant and avoid confusion, my testimony will address the outlay function of the budget.

Mr. Chairman, as of this writing, the budget for the Veterans Administration has not been established. At this point, there is no way of knowing what dollar amounts will be agreed upon by the Senate, the Congress and the President. We do know, however, those areas where serious consideration is being given in making deep cuts in veterans benefits, entitlements and, in general, the VA's ability to service its constituents.

According to the Administration, on September 30, 1985, there were approximately 27.8 million veterans, 49.4 million family members of living veterans and 2.1 million survivors of deceased veterans. While obviously only a portion of these people will be utilizing the many VA benefits and entitlements available to them, the VA must be prepared to adequately meet these needs. In addition, that population's life expectancy is rising because of modern science and medicine. As a result, the Veterans Administration is on the threshold of having to accept new challenges in providing benefits and entitlements to those eligible. It is for these reasons the VFW finds the proposed fiscal year 1987 VA budget severely lacking in the basic funding levels to provide for this challenge and to preserve the integrity of the total VA system.

Mr. Chairman, as you know, the budget proposed by the President for the Veterans Administration for the fiscal year 1987 is $26,600,000,000 in budget authority. This figure represents a decrease of $408,000,000 from the current fiscal year. In outlays for fiscal year 1987, the President proposes a spending level of $26,300,000,000--down $185,000,000 from the current fiscal year. It should be noted, the House and Senate Veterans' Affairs Committees as well as the Senate Committee on the Budget also agree with our assessment of the President's recommendations. It is evident they too believe the President's request is inadequate. In each case, these committees have recommended higher amounts.

In what appears to be a disappointing trend (and what very well may be disastrous), the VA's portion of the Federal budget continues to shrink year after year. The VA's proposed budget outlays for fiscal year 1987 is only 2.5 percent of the total outlays of the Federal budget--the lowest percentage in recent history.

Unquestionably, the President's proposal takes direct aim at undermining the integrity of the VA's ability to provide adequate health care to our nation's veterans. Let the numbers speak for themselves. Outlays for fiscal year 1987 medical care programs would be $102,400,000 less than provided for in fiscal year 1986. Existing medical care staff would be cut by nearly 8,000 personnel. This is in addition to the $120,400,000 and 1,340 personnel reductions just recently placed into effect as a result of Gramm-Rudman-Hollings. This means that a grand total of over 1,300 nurses and almost 500 physicians will not be in VA hospitals caring for the increasing patient load. This budget proposal requires that 57,354 fewer veterans receive inpatient treatment from the VA and proposes a further reduction of 1.1 million in outpatient visits during fiscal year 1987. The VA estimates that up to 37,000 veterans are already being turned away each month from VA health-care facilities.

Mr. Chairman, at a time when the Administration is voicing its concern about the aging veteran and its obligation to provide extended care, we find it curious the budget proposal does not properly address this concern. In fact, the VA proposes to reduce its present 40% share of nursing home beds to 30%. While we certainly commend the VA's attempt to address this problem by initiating the conversion of a portion of their acute-care beds to long-term care beds, however, we believe greater emphasis should be placed on this effort.

It is our understanding only a net gain of 59 nursing care beds would be realized under the conversion plan. Taking into consideration there are 172 VA hospitals, this equates to .34 beds per hospital--hardly enough to make an impact in this much needed program. The VA must recognize that the aging veteran will require increased acute care so, therefore, the conversion strategy must not be allowed to undermine the VA's acute-care capability.

It is obvious, the current budget reflects OMB's directive to reduce actual major construction projects from five projects a year to two. At this rate, it appears the VA will have a very difficult time in providing modern facilities for their acute and long-term care responsibilities. The VFW believes it is essential to initiate an agressive modernization/renovation/replacement program inasmuch as 53% of VA's beds are housed in buildings over 30 years old.

The VFW applauds the proposed increase in outlays for medical and prosthetic research from about $181.5 million in fiscal year 1986 to approximately $187.3 million in fiscal year 1987. This represents an increase of about $5.8 million in an area in which the VA has long been regarded as a leader and for which there is no replacement in the private sector. VA medical and prosthetic research has brightened and improved the lives of those veterans for whom this nation owes its greatest debt--those who sacrificed their physical and mental and, yes, even spiritual well-being in the service of their country. Further, it must be remembered that in providing for these very special citizens, the VA has also improved the lot of each and every American. Unfortunately, within the area of medical programs, reductions in outlays are being proposed in medical administration, miscellaneous operating expenses, grants to the Republic of the Philippines, the Canteen Service Revolving Fund, and the Special Therapeutic and Rehabilitation Activities Fund. Once again, the VFW is alarmed that reductions are being proposed within the VA's medical programs at a time when the facts clearly argue for an increase.

Personnel reductions are not only going to be felt in medical care but also in the Department of Veterans Benefits. While DVB shows an overall increase of 400 personnel, regional offices will lose about 211 key support service personnel. This decrease is justified by the dubious claim they will not be needed because of modernizations in the delivery system. While we support this modernization effort, we only wish to remind this subcommittee to look back to the 1970s when vast premature reductions of Regional Office personnel were carried out on the basis of the TARGET system which never fulfilled its promise. Actually, when the 400 personnel increase in DVB is closely scrutinized, this increase is for the most part only a paper transfer of computer operators from the old Office of Data Management and Telecommunications.

The proposed budget contains numerous legislative proposals, some of which will totally destroy proven, beneficial programs. One proposal calls for the redefining of the eligibility requirements for receiving a cemetery plot allowance. As you know, we opposed the elimination of the $300 burial allowance for those not in receipt of disability compensation and we certainly oppose the attempt to deny a similar benefit--the $150 plot allowance to this same group of veterans.

The President is also asking Congress to approve legislation affecting the VA Home Loan Guaranty Program by increasing the loan origination fee from the current one percent to two percent. This fee would gradually be increased to 3.8% by 1990. We believe this increase is totally unnecessary inasmuch as the revised estimated demand for a VA guaranteed loan will generate increased revenue from the current one-percent user's fee. I would like to point that an increase in the user's fee in all likelihood would prove counterproductive by decreasing the demand and therefore reducing revenue.

Another initiative proposed by the Administration is the repeal of the new GI Bill. Mr. Chairman, the VFW does not understand how the Administration could even consider such a proposal. In hearings held by the House Veterans' Affairs Committee, just a few months ago, evidence and testimony clearly affirmed the program as being a total success. Preliminary data have shown the new GI Bill as being directly responsible for dramatic gains in military recruitment and retention allowing our nation to maintain and improve its strength levels for both active duty and reserve forces while avoiding a return to the draft. The program's cost will be offset several times over by reductions in bonus pay and training costs. We believe it would be a tremendous mistake to have encouraged thousands of young recruits to join the military and obtain an education under this specific program then suddenly deny them that opportunity. The United States Army in a document prepared in response to this budget decision stated the repeal of the new GI Bill will cause "widespread confusion and turbulence" and damage the recruiting program. The document also stated: "(The GI Bill) is a low cost, highly visible means for economically deprived youth to finance a higher education and fully achieve their potential...New soldiers in the Army are participating in the new GI Bill at rates dramatically higher than the previous education program."

In closing, Mr. Chairman, permit me to take this opportunity to express the appreciation of the Veterans of Foreign Wars of the United States to this Subcommittee and the Senate Appropriations Committee for having over the years demonstrated genuine compassion and consideration for our nation's veterans and, also, to their understanding with respect to our concerns and recommendations.

ADDRESSING THE DEFICIT

Senator GARN. I don't disagree with what you have said about a responsibility to care for veterans. Put yourself in the position of the President or this subcommittee or the Congress. We've got a $2 trillion deficit. Virtually every bit of testimony that I will hear from the public witnesses is, don't cut us. Daily I have people come in to my office who say, our association has passed a resolution, Senator, and our first responsibility, we want to tell you, is that we are in favor of a balanced budget. Our second position is, don't cut us.

How do we handle that side of a problem? We have a deficit that is beyond my ability to comprehend. I never thought I would live long enough to see a $2 trillion deficit.

And, I'm a member of the VFW and I'm a member of the American Legion, but every year I have asked the VA to come up with some suggestions of how we might save and all we ever hear, your organization, the others and from the VA, is a patriotic theme of, "Take care of veterans." And, somehow, if we don't go along, that you're antiveteran.

Well, I spent 24 years in the military. My record on defense spending and so on is hardly anti that, but I remember the trouble I got in on the floor last year and all I have asked year after year is how about some suggestions? There are $600 dollar toilet seats in the Veterans Administration too, just like there are in the military, just like there are in housing programs under HUD. There's waste and there is inefficiency. There have been major scandals in the major construction programs.

So, I'm not here to argue with you or single you out, your organization, not you personally or the VA, but it's fine to come in and say, "Yes, we have a responsibility to veterans." Who's going to disagree with that? I don't disagree with that. I don't disagree with anything that you have said particularly.

But, when are we going to get people to come in and say, yeah, we've got a responsibility to provide nursing homes and all of this, but a critical look at the program.

I'm not going to take your time to go back into the construction program. We had problems at my own VA hospital in Salt Lake, but it's the only way we're going to solve problems when people just quit coming and asking for more and saying, "Yeah, we need more in this area."

ELIMINATION OF WASTE AND INEFFICIENCY VERSUS GRAMM-RUDMAN

And, the best way to get more in nursing homes and so on is to be objective about the programs and where there is waste and inefficiency, help us in trying to find those areas so that you don't just get across the board cuts which is what Gramm-Rudman threatened.

Nobody seems willing to look, realistically at the programs, recognizing that there is a problem in virtually every governmental program. As far as waste and inefficiency and so on, I'm getting to the point of frustration. I don't know how to handle it anymore.

Mr. Magill. Mr. Chairman, the VFW has never said, you know, do not cut us. Over the past 5 years, I believe, and I honestly believe this is a conservative estimate, over $2 billion in cost savings has been achieved through the Veterans Administration.

So, we have always advocated that we are willing to do our part in cost savings in the deficit. We, of course, agree with you. It is a terrible situation we have right now with a deficit of $2 trillion. We agree with you wholeheartedly.

Senator Garn. Well, once again, I agree with you, but when will somebody come up with some specific recommendations, come in and say, "We think you can cut here; we think we have seen some waste here; look into it." We all deal in generalities—Congress is the worst of all of dealing in generalities.

Sure you're willing to take some cuts, but we're dealing almost entirely in this body and again, please don't misunderstand me, I'm not singling out, in platitudes and generalities, and that is why we've got a $2 trillion deficit.

The VA won't do it. When I requested construction priorities 2 or 3 years ago, a parking garage in San Francisco showed up as the No. 1 priority. Well, that doesn't put veterans in beds; that puts cars in a place, and that's the best I can get.

Is there anybody out there that can come up with a program that is objective and say, "We need money for beds, we need money for nursing homes, because the veteran's population is aging and we think you can find it over here because the VA is screwing up and they're wasting a lot of money."

That's the kind of testimony I'm looking for, and its throughout the 18 agencies reporting to this subcommittee. If I were here, that's what I would be asking witnesses to do and I can't get it. So, it doesn't do any good to say, "Yeah, we're willing to play our part." Everybody says that. Congress says that. We got a mess over on the floor and nobody will vote the way they talk.

Well, I'm putting you on the spot and it's unfair for the whole governmental problem to stick you with it and I don't intend to do that.

Anyway, my suggestion is that you might suggest to your organization that maybe next year there be some specific recommendations rather than telling us what you need, which I am not here to fight, where we might be able to get some of that money so that we're not hurting vital programs.

There's a lot of waste in the VA. There's a lot of waste in HUD. There's a lot of waste in the military. There's a lot of waste in virtually every program. So, that's where I would like to get some of these savings so we can say, "OK, we agree with you, we need it here. We need more nursing homes, we need new facilities, and this is where we're going to get them because we've got $600 toilet seats over here." The military isn't the only one with $600 toilet seats.

Thanks for being my first witness and my speech was for everybody that's coming up, the next 59 witnesses as well. You have taken it for all of them. Thank you, Mr. Magill.

Mr. MAGILL. Thank you, Mr. Chairman.

ENVIRONMENTAL PROTECTION AGENCY

STATEMENT OF DR. LEONARD H. WEINSTEIN, PROGRAM DIRECTOR, ENVIRONMENTAL BIOLOGY, BOYCE THOMPSON INSTITUTE FOR PLANT RESEARCH, CORNELL UNIVERSITY, ITHICA, NY

Senator GARN. Doctor Weinstein.

Dr. WEINSTEIN. Thank you, Mr. Chairman.

My name is Leonard Weinstein. I am from the Boyce Thompson Institute at Cornell University. I am an environmental biologist and I am representing the National Association of State Universities and Land-Grant Colleges. The purpose of my appearing here is to encourage, at least a redistribution of available funds in the Environmental Protection Agency, to emphasize more long-term research rather than the short-term fix which has been more or less a hallmark of the agency because of the mandate to be an enforcement institution

The importance of of long-term research can be best exemplified by using a couple of examples.

My testimony, of course, is much longer. I have submitted it and I hope that someone will have the opportunity to read it.

I will just briefly discuss three programs that EPA has sponsored, and I must say that I compliment them on even sponsoring these programs.

OZONE

The first of these was called the national crop loss assessment network. It started in 1980, the purpose of which was to determine, for the national air quality criteria, the reexamination of the standard for ozone in the atmosphere.

What the economic impact is on the crops of this country from ozone in the atmosphere. Ozone is by far the most important pollutant in the United States. It's generated by automobiles, sunlight, and by emissions from power plants and other stationary and mobile sources.

We had no idea what kind of economic loss this country was sustaining from just the amount of ozone present in the air. So, EPA started a program in 1980 and 4 institutions began intensive research on losses from ozone. There was marvelous cooperation between North Carolina State University, Argonne National Laboratory, University of California at Riverside, Boyce Thompson Institute at Cornell and, under the EPA laboratory in Corvallis.

After 5 years of research on crops such as corn, soy bean, wheat, cotton, grain sorghum, and barley, we have come to our first economic conclusion and I think that perhaps this may be the first time it's being announced.

If the 1980 level of ozone present in our ambient air in the United States were reduced 25 percent, it would be a saving to this country of $2 billion. In other words, we, in 1980, were already loosing $2 billion in crop losses from the presence of ozone in the atmosphere.

If the 1980 level were raised 25 percent, and it probably has between 1980 and 1986, then there would be an additional $2 billion loss. By the way, those are 1981 dollars, not 1986 dollars, so I think we could perhaps add a little to that.

So, you can see, we already have a serious problem in crop losses in this country. Now, one might say that since we're a country that produces more crops than we need, that this is not very important, but you know what all the political ramifications are of having the extra crops in order to—for political purpose and socialogical purposes.

ACID RAIN

The second program that I think is worthy of discussion is the new Forest Decline Program, variously known as Acid Rain Program, the Destruction of Forests, which everyone reads in every newspaper all the time.

It is true the forests of the Northeastern or Northern part of North America—I'm sorry, Eastern North America and Europe, Scandanavia are dying, especially the conifers and, in our country, especially red spruce in the North and frazier fur in the South.

The West has not been badly hit yet for a number of different reasons. The fact is that it's being ascribed to acid rain and most scientists working in the field believe that acid rain is only a part of it and perhaps not even the most important part.

We think that other pollutants such as ozone again, are major culprits. After all if ozone could reduce crops by over $2 billion, it could affect the forester crops too and their plants and they respond the same way.

So, what is unfortunately happening is that the EPA and the U.S. Forest Service jointly sponsoring a program, competitively, are now supporting some research which appears to be a 2-year program.

Now the forests began declining in 1940 and they have been going on for more than a generation and we are not going to solve that problem and we're not even going to begin to solve that problem in 2 years.

The first year we need to grown the plant. The second year, I don't care how good the scientists are, they're not going to be able to do it.

So again, what we need is a sustained program, not asking for more money, but asking for the money to be distributed in such a way that it does the most good.

COMPETITIVE GRANTS

And, finally, we have a program in EPA called the Competitive Grant Program, which allows scientists to generate their own ideas, present them to EPA and ask that peers review it and then based upon a ranking system, to fund these programs, starting at the top and going down.

In 1981, that program was funded at $21 million which in todays dollars would be about $28 million. In 1986, the program has been funded at $10.8 million. Is scheduled for a reduction of 35 percent to $7 million, which is 25 percent of what it would have been if it had been funded at the level in 1981.

If we understand that there have to be cuts, we do think that the cuts in this particular program, for this long-term research program of EPA's are really pathetic. So, what it seems to us is that as the problems get more serious in this country, in environmental sciences, all environmental sciences, there is an inverse relationship between the seriousness of the problem and the amount of funding available for this long-term research. Thank you very much.

Senator GARN. Thank you very much, Dr. Weinstein, Your testimony will be looked at; it won't be ignored.

[The statement follows:]

STATEMENT OF DR. LEONARD H. WEINSTEIN

Program Director, Environmental Biology
William Boyce Thompson Distinguished Scientist
Adjunct Professor, Department of Natural Resources, Cornell University
and
Dr. Jay S. Jacobson, Plant Physiologist
Adjunct Professor, Department of Natural Resources, Cornell University
Boyce Thompson Institute for Plant Research at Cornell University

I am Leonard H. Weinstein, William Boyce Thompson Distinguished Scientist, Program Director for Environmental Biology, Boyce Thompson Institute for Plant Research at Cornell University and Adjunct Professor of Natural Resources, Cornell University.

I have been involved in research on the effects of atmospheric pollutants on plants for more than twenty years. I presently direct a group of scientists who are conducting research on the effects on plants of fluorides, ozone, sulfur compounds, nitrogen compounds, acid rain, airborne particles, and PCBs.

I am here today to testify on behalf of the Committee on Energy and Environment of the National Association of State Universities and Land-Grant Colleges (NASULGC).

The purpose of this testimony is to comment on the availability of adequate support for long-range basic and applied research on environmental problems within EPA and at universities and agencies outside of EPA.

In 1977, the National Academy of Sciences reported to the U.S. EPA the findings of their study entitled: "Research and Development in the EPA". The report described the role that research and development should play within EPA and how EPA might obtain the kind of scientific and technical information they need to support their mission. The Academy identified three objectives for research by EPA: (1) research to directly support decision making, (2) research to anticipate environmental problems, (3) research to advance fundamental analysis of environmental processes that is not supported by other agencies. We submit that the ever-increasing urgency of environmental problems and limited resources for support of research has forced EPA to commit a major share of these resources to the first goal, that of conducting research to directly support decision making. Only limited resources have been committed to the second and third goals. During the last nine years, it appears that EPA's support of research on emerging environmental problems and research to advance fundamental knowledge of environmental processes has suffered. This is a serious problem that should be considered in the EPA budget development process.

The Committee on Environment of the National Association of State Universities and Land Grant Colleges (NASULGC) has provided testimony before this Committee each year since 1983. Each year, the words have been different but the theme has been the same: it is essential for EPA to support research of all kinds, but especially long-term research, if it is to fulfill its mandate to regulate and abate the introduction of man-made toxic substances into the air, water, and soil environments. As scientists and environmentalists, we must know where in our environment the impacts might occur, how they might affect living and non-living components of the environment, and how these substances may persist, be transformed, and transported over the long term.

EPA cannot fulfill its regulatory functions without an understanding of basic and applied environmental processes ranging from atmospheric chemistry to transport, deposition, and ecological effects. Increased support for long-term basic and applied research will not only improve our understanding of biological problems posed by environmental contamination, but will also provide a reservoir of scientific information in many scientific disciplines that can be used to accomplish EPA's missions and to assist Congress in its guidance of what EPA's goals and methods should be.

In recent years, EPA has shifted the awarding of research funds from grants to cooperative agreements and contracts in order to have more control of specific objectives, schedules, and procedures for the support of mission-oriented research. Grants are useful for support of longer-term, fundamental research because they allow flexibility and encourage initiative, creativity, and originality. The shift away from research grants and lack of funds for fundamental research leaves us with serious gaps in our basic understanding of environmental processes that is needed to support and improve the credibility of mission-oriented research. This problem was recognized in 1977 when the Academy report stated that: "EPA has consistently felt unable to sustain certain important research programs, especially those ... that require a stable, long-term commitment of resources. In this category are programs conducted to anticipate future environmental problems or to advance fundamental scientific understanding, as well as some programs that have direct bearing on decision making, but need a long time, such as environmental epidemiology." During the last nine years, these deficiencies have become more serious and we support the Academy suggestion that provision be made through the budgetary process to provide a wider base of support within EPA for long-term, fundamental research on environmental issues.

The existence of stable, long-range research programs at our universities and research institutes will provide the future manpower needs for EPA and for this nation's industries. Scientists trained in these programs will have the capacity to solve environmental problems before we blunder into some new ones that prove to be of national or international significance.

Three examples of the needs for a long-term research agenda can be offered, two that have proven successful, the other, still in its infancy.

The first is the EPA-sponsored National Crop Loss Assessment Network (NCLAN), the second is the Research Centers of Excellence program, and the third is the recently initiated EPA/U.S. Forest Service cooperative efforts in forest decline (the so-called acid rain and forest program). The NCLAN program was designed as a long-term study to define the relationships between yields of major agricultural crops and three major air pollutants, ozone, sulfur dioxide, and nitrogen dioxide, and their mixtures. The results were to be used to provide an economic assessment of air pollution-induced crop loss and to support the development and/or review of National Ambient Air Quality Standards. At its inception, the program was designed to advance the understanding of cause-and-effect relationships that determine crop response to air pollutants. Secondary objectives included the combined action of pollutants and other stresses important in agriculture such as drought, diseases, and insects. Early in the program, a lack of funds forced EPA to direct that the research be focused only on ozone, and there has been little research with other important pollutants or their combinations. Although we now know that ozone is the most damaging air pollutant to plant life, one could never expect that ozone would occur alone in the atmosphere, and effects of mixtures remain largely unknown. Despite elimination of many of the original primary objectives and all secondary objectives of NCLAN because of reduced funding, the program has been successful because it has included scientists from many disciplines, who benefitted from excellent cooperation, coordination, and dedication of scientists in the EPA laboratory at Corvallis, and at the four research sites at North Carolina State University, Argonne National Laboratory, The University of California at Riverside, and at the Boyce Thompson Institute at Cornell University. After 5 years of field and laboratory research, NCLAN's first economic estimates indicate that the benefits that would accrue if the level of ozone was reduced only 25% below that of 1980 for corn, soybean, wheat, cotton, barley, and grain sorghum would be $1.8 billion, and if the ozone level were raised 25% it would cost the consumer $2.1 billion (in 1980 dollars). These are only preliminary estimates, but they are based on sound econometric principles. They do not, however, include the regional losses that would be sustained with many other crops, such as grapes and vegetable crops in California, apples in New York, or citrus crops in Florida, which although small in national terms, can be devastating to local economies. Few, if any, of these crops have been studied nor is there any plan to continue the NCLAN program to do so.

The second example of how long-term research can benefit EPA is the program on Research Centers of Excellence, first established in 1979. Their purpose is to provide (1) research training that emphasizes long-term environmental problems, (2) forecasting of future problems by focusing and evaluating a large body of basic scientific knowledge, and (3) providing guidelines with respect to the kinds of research needed to evaluate the extent of existing and emerging problems. The centers are devoted to different areas of research and, although awarded competitively, are distributed throughout the U.S. As has generally been the case with EPA support, year-to-year uncertainty in funding can seriously disrupt the programs in terms of personnel and as the overall programs relate to long-term effects and assessments.

The third program deals with the unexplained decline of spruce and fir forests of eastern North America, although decline of a number of other species, including sugar maple and several species of pines, have been reported. In areas where this problem exists, there is decreased growth and increased mortality of forest trees,. and their natural cycle of regeneration has been disrupted. One of the reasons for this decline may be that the development of fossil fuels for energy, transportation, and industrial production has produced primary air pollutants, which have led to the formation of acid rain. Although there is general agreement among scientists with regard to the effects of acid rain on lakes and fisheries, we are still not certain of the degree of effects of acid rain on crops and forests. On the one hand, there is evidence that acid rain in its present composition and degree of acidity may have no effects (or even beneficial effects!) on certain crops and forests. On the other hand, acid rain may be responsible for long-term detrimental effects on forests of not only eastern North America, but also Europe. In 1983 testimony to this Senate Committee by NASULGC, we stated that ".....we can presume that acid rain is a principal cause of the problem, but we should not ignore the long-term effects of ozone and the possibility of its combined effects with acid rain and other stresses".

As presently constituted, the new EPA/U.S. Forest Service Consortium to study the decline of forests appears to have a 2-year life span. A problem that took perhaps one or more generations to evolve, considering the complexities of forest ecosystems, can in two years only begin to suggest the most profitable directions for a long-term research program.

Finally, the only EPA program where scientists can apply for truly peer-reviewed competitively funding to support individual research projects, the Competitive Grants Program, will be all but decimated if the proposal for funding from an already impoverished $10.8 million is cut by $3.8 million. In 1981, $21 million was allotted for this program, which in 1986 dollars would be about $28 million. It would appear that funding for grants is inversely related to the seriousness of environmental problems.

There are a great many unanswered questions concerning the effects of atmospheric pollution on man's health and on the general quality of the environment. A great deal of information is and will be needed to understand better what we can and should tolerate in the environment, what can be done to ameliorate problems with which we are currently faced, and perhaps most importantly, what can be done to prevent severe environmental problems in the future.

STATEMENT OF GAYLE J. SMITH, PRESIDENT, ASSOCIATION OF STATE DRINKING WATER ADMINISTRATORS

EPA—DRINKING WATER PROGRAM

Senator GARN. Next, Gayle Smith.

Gayle, we're happy to have you with us this morning, the director of the Bureau of Public Water Supply, Utah Department of Health.

Mr. SMITH. Correct, Mr. Chairman, I really appreciate the opportunity of appearing before you and offering testimony.

My name is Gayle Smith and, as you mentioned, I do direct Utah's drinking water program. I am also the president of the Association of State Drinking Water Administrators who represent the State, the Governors issues on drinking water programs throughout the country.

Also, you will be interested to know that I have just recently been appointed, by the Administrator of EPA to chair the National Drinking Water Advisory Counsel and give him independent advice regarding drinking water issues.

In my testimony today, I hope to portray a unanimous and an urgent plea and concern from the drinking water program managers across this country and that is simply that with dwindling resources and increasingly increasing demands, if that makes sense, placed upon the primacy agencies the responsibilities, it's really creating a crisis in public health and it pains me to have to say this, but as a professional engineer and a public health professional, but public health is being compromised across this great country as it relates to drinking water.

I guess the States are picking up up to 74.4 percent on the matching of the drinking water program that is unlike other grant programs. The only assistance that we have really realized since 1980 is the assistance that the National Rural Water Association has given us which has us which has been a real valuable asset throughout the country.

Let me paint just a little bit of a picture, if I could. The States have historically had State drinking water programs. I believe that the earliest goes back to 1915, the advent of EPA 1974 with Federal Safe Drinking Water Act. That's well over one-half a century States were really implementing drinking water programs on their own. With the advent of the Federal Safe Drinking Water Act, we had some 22 maximum contaminant levels established substances which were regulated, if you will, with all the inherent monitoring reports and other provisions that go along with that.

Since that point in time, we have added the herbicide, the organic. We've added also the chlorinated hydrocarbons, the total triheleme-thanes. Detailed reporting requirements and violation specifics to go along with those. Increased compliance, increased sanitary surveys, and now we're faced with EPA's new regulatory agenda, phase I through IV, which is really imposing a burden.

To typify that burden, they're being asked by Congress to promulgate regulations for up to 85 new chemicals over the next 3 years. That's a multiple of 4 in just the next 3 years. That's only for the first phase, and for that first phase, we're looking at $23.1 million annually to implement and carry out.

Then you add to that the desire to have the States implement noncommunity water system programs and then the Reauthorization Act which is just now being entertained and the amendments to it saying we need to embark on a great ground water protection program, well head protection program. It mandates certain time frames for EPA to promulgate certain regulations and it mandates filtration of all surface water facitities. It madates disinfection of each community water supply and it mandates other monitoring reporting procedures. Hugh burdens which have come to the drinking water program managers just recently and will come in the near future.

Evidence of the resource shortfall. As I mentioned before, we have had no grant increase since 1980. It's not been a very—dare I use the word, "sexy" program. It can't compete with the other big dollar programs, if you will. In fact, we've had a 30-percent reduction in real dollars over that same time frame, and yet the workload is greatly increasing and, in fact, as I mentioned, increasing at an increasing rate. The current staffing, to typify what I am saying, is 1,100 to 1,500 full-time employees short. Now, this is nationwide, of the 1975 staffing needs, as estimated by EPA. So that means we're $60 million in the hold just to try and meet the 1975 level.

Again, the only relief that we have seen from that is what is coming through to the State programs, indirectly through the National Rural Water Association. Thank heavens for them.

SUMMARY

The intent of Congress is clear. They want to regulate drinking water throughout the country; two, greater resources are absolutely essential; three, no new provisions can or will be implemented without new resources; four, public health is, has been, and will be compromised if we do not implement, and we'll have more resources to do what we should have been doing and what we are now being asked to do; and fifth, Congress must now back the mandates or modify them or admit that they simply won't be implemented.

Again, it pains me as a professional in the field to have to bring this to you because I am not one for big government and I appreciate very much what you just said earlier. I don't know the answer though. I'll be happy to respond to any questions, Mr. Chairman.

Senator GARN. Thank you, Mr. Smith. I am pleased that you're here, not only representing the State of Utah, but also the Association of of State Drinking Water Administrators. I congratulate you on your advisory position and we will take a serious look at your testimony.

Thank you very much.

Mr. SMITH. Thank you very much, Mr. Chairman.

[The statement follows:]

STATEMENT OF GAYLE J. SMITH, P.E., PRESIDENT, ASSOCIATION OF STATE DRINKING WATER ADMINISTRATORS

I. INTRODUCTION

Good morning, my name is Gayle J. Smith, I am the Director of the Bureau of Public Water Supplies for the Utah State Department of Health and the President of the Association of State Drinking Water Administrators (ASDWA). I also serve as the Chairman of the National Drinking Water Advisory Council.

My testimony today will be presented on behalf of ASDWA and reflects the general consensus of our membership. For those of you unfamiliar with our organization, ASDWA was conceived and founded in 1984 by members of the old State Liaison Group, an EPA advisory group made up of state drinking water program managers from each of the ten federal regions. The organization was formed because state administrators did not feel that existing bodies could adequately meet the communication and coordination needs of their programs. The primary purpose of ASDWA is to provide state primacy agents a collective voice on issues related to the protection of public health through the assurance of high quality drinking water.

While drinking water issues have not received the notoriety of other recent environmental problems such as hazardous wastes and toxic substances, it is obvious that all these issues are closely linked. In fact, the need to safeguard drinking water supplies often provides the primary basis for most of the laws which seek to address these and other environmental quality issues.

Despite the recognition that safe drinking water has been one of the most critical environmental health issues in recent years, and the fact that the states bear primary responsibility for the implementation of drinking water programs, most state agencies have historically been grossly understaffed and under-funded. Nevertheless, because of the professionalism and commitment of primacy state programs, the public has generally come to take safe, pure drinking water for granted at all times.

Through my testimony today, I wish to convey the unanimous and urgent concern held by drinking water program managers that the dwindling availablity of resources will inhibit the ability of states to carry out ever increasing statutory and regulatory responsibilities. It is ASDWA's strong belief that substantial increases in Public Water System Supervision (PWSS) grants will be necessary to effectively meet these added responsibilities and to continue to provide the drinking water quality which the public has come to expect.

II. HISTORICAL PERSPECTIVE OF DRINKING WATER PROGRAM MANAGEMENT

Past History

While public water supply management programs have been operated by the states for many years, the Federal government, through the enactment of the Safe Drinking Water Act, became involved in the process in 1974. This larger Federal role in drinking water programs was justifiable largely due to the disparities which existed in the quality and scope of state programs nationwide, and the inefficiency which would result from the potential development of 50 different sets of drinking water standards.

Since the enactment of SDWA the number and type of regulatory responsibilities imposed upon state agencies has increased dramatically. Initially, National Interim Primary Drinking Water Standards were promulgated for only 22 contaminants, and monitoring and reporting requirements were comparitively limited. Then, in 1980, additional requirements for monitoring, reporting and treatment for total trihalomethanes (TTHMs) were enacted.

During the years of SDWA implementation, many state governments enacted additional statutory requirements, usually increasing their state agencies' responsibilities considerably. Further, a variety of administrative actions were taken by EPA, such as changes in reporting requirements and additional sanitary surveys, which also increased the state primacy agent's workload.

Current and Future Developments

The additional requirements which will be imposed on states with the Phase I-IV Regulations and the reauthorization of the SDWA are enormous. Up to 85 additional maximum contaminant levels (MCLs) will be promulgated over the next few years. The laboratory certification, monitoring, reporting and data handling responsibilities involved in enforcing these standards will be immense. The estimated additional costs to state governments for the first ten years of implementation of the Phase I VOC regulations alone are $23.1 million (see Table 1).

Additionally, EPA is considering the feasibility of including certain types of non-community water systems (which are now not subject to most regulations) under the new requirements. This will present added strain of state resources, particularly if the regulations do not provide for maximum state flexibility.

Finally, the reauthorization of the SDWA will represent increased administrative and technical responsibilities for state programs. The well-head protection programs, requirements and deadlines for promulgation of MCLs, and mandatory monitoring, filtration and disinfection provisions all will represent increased burdens on state resources.

III. RESOURCE SHORTFALLS

Despite the added programatic responsibilities described above, appropriation levels for PWSS grants have not increased above the 1980 level (see Figure 1). Adjusted for inflation, this represents significant decreases in real dollars available to state programs through federal grants.

ASDWA has initiated a survey of program managers designed to quantify state resource needs over the next several years. We will be delighted to provide the Subcommittee with the results when they become available. For illustrative purposes, we have developed a rough estimate based on existing data (see Table 2). Our best estimate is that states would currently require an additional 1100-1500 full-time equivalent employees in order to meet the minimum baseline necessary to run their programs adequately, based on regulatory and statutory requirements in existence in 1975. This does not account for additional workloads imposed by the more recent regulations and amendments and does not include laboratory personnel, as these services are assumed to be conducted by private labs for Phase I-IV contaminants.

Using a conservative estimate for compensation plus related employee expenses of about $40,000/year/FTE and assuming that between 1100 and 1500 additional FTEs would be necessary nationwide, additional resources of $44 - 60 million per year would be required to fully meet these needs.

Without these added resources, and with increased regulatory responsibilities, states will be forced to further prioritize programs and curtail additional activities. This may include actions such as the following:

- Limitation of enforcement activities to problems where accute illnesses might be involved (i.e., violations of bacteriological and/or turbidity standards);
- Curtailment and limitation of activities on the non-community water supply programs;
- Elimination or drastic reduction in monitoring for inorganic and radiological contaminants where a history of contaminant levels has been established; and
- Reduction in the extent of sanitary surveys and other field activities.

IV. CONCLUSION

ASDWA agrees that strengthened laws and regulations to ensure safe drinking water are both necessary and desirable. We feel that standards for VOCs, SOCs, radionucludes and other toxic contaminants should be promulgated and implemented as soon as possible. And, with adequate flexibility afforded to the states, we agree that further measures such as monitoring for unregulated contaminants, closer regulation of certain NCWS and stricter protection of public water supply wells and filtration of all surface water supplies may be required to protect public health.

However, the question ultimately becomes, who will pay for these added services? At this time, the answer appears to be that no one wants to assume these added budgetary responsibilities. More and more responsiblity for drinking water program administration and support is being shifted to the states; yet, data from a 1985 report on non-community water systems show that some states already contribute as much as 74.4 percent of total PWSS funds (see Table 3). Most states will be unwilling to increase these percentages. In fact, the mandatory reductions in Federal grants required as a result of Gramm-Rudman have in some cases been compounded by proportional reductions in the state contributions. In Michigan for example, the state program not only had to absorb a five percent cut in funds from their federal grant, but an additional reduction of over three percent of the matching state funds.

The Federal government, through expanded EPA regulations and through the current amendments to the SDWA, has plainly shown that the continued provision of safe drinking water is of the highest priority. The Association of State Drinking Water Administrators shares this view and is committed to this goal.

To effectively and universally achieve this goal however, ASDWA strongly feels that appropriation levels, which have historically been held far below actual authorization levels, must be substantially increased for Public Water System Supervision Grants. As stated below, our estimates for minimum, baseline state drinking water program staffing and resource needs run as high as $60 million in additional funds in order to properly impelement the Safe Drinking Water Act and its attendent regulations at the State level. Without maximum primacy agency flexibility and increases in state Public Water System Supervision Grants, difficult decisions regarding the prioritization of existing water supply activities will have to be made.

Thank you and I will be happy to answer any questions at this time.

FIGURE 1

PWSS GRANTS 1976 - 1986
Appropriated and Inflation Adjusted

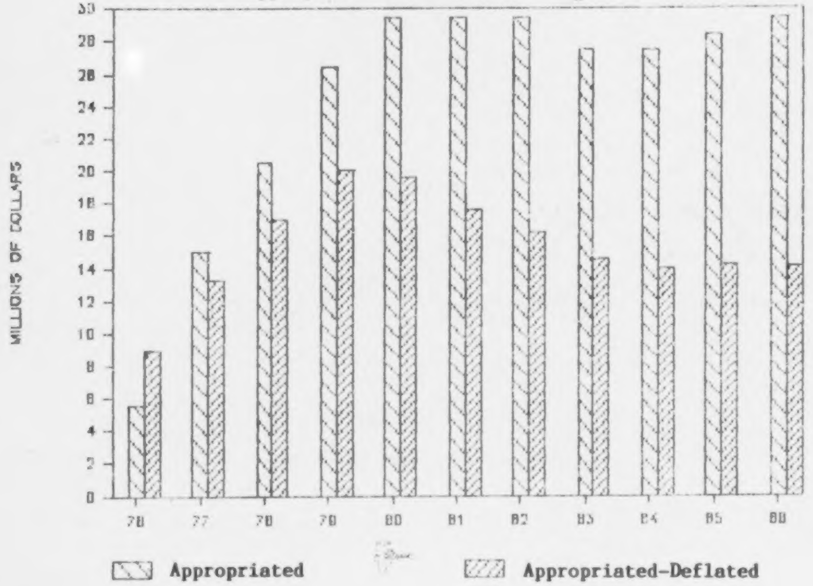

TABLE 1*

ESTIMATED NATIONAL COSTS OF STATE GOVERNMENT IMPLEMENTATION OF EPA REGULATIONS FOR VOCs**

	For Current State Program	For Additional EPA Regulations
Start-Up Costs	$12.8 million	$ 4.1
Ongoing Costs	5.6	1.9
Total Costs Over First Ten Years With VOC Regulations	----	23.1

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* Source: U.S. Environmental Protection Agency, Office of Drinking Water, *Economic Impact Analysis of Proposed Regulations to Control Volatile Synthetic Organic Chemicals (VOCs) in Drinking Water*, October, 1985

** A loaded rate of $40,000/work year was used to determine labor costs.

TABLE 2

STATE STAFFING ESTIMATES

	Community Systems		NCWS		Total FTE (Existing)	Total FTE Less Lab. (Needed)
	# Systems	FTE	# Systems	FTE		
EPA/CSSE (1973)	44,389	1654	254,100	2909	4563	2653
NSF (1974)	49,166	3301	230,367	3169	6470	3575
EPA (1975)	40,000		200,000			2726
1984 FRDS[1]	58,300		148,000		1200-1600	

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[1] Estimate derived from data collected under a 1985 study of non-community water system programs in nine states, funded by U.S. EPA, Office of Drinking Water.

TABLE 3***

STATE BUDGETS FOR PUBLIC WATER SYSTEM SUPERVISION
FY-85

State	Federal Share	%	State Share	%	Total
Florida	$ 940,600	41.6	$1,320.639	58.4	$2,261,239
Minnesota	699,615*	55.4	562,000	44.6	1,261,615
Utah	294,500	45,3	355,500	54.7	650,000
West VA	314,000	42.8	420,058	57.2	734,058
Michigan	853,600	35.3	1,566,100	64.7	2,419,700
Missouri**	698,288	46.8	795,141	53.2	1,493,426
Washington	675,325	49.2	698,310	50.8	1,373,635
Texas	1,792,100	45.4	2,152,804	54.6	3,944,904
New York	1,827,000	25.6	5,304,200	74.4	7,131,200

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* includes $63,615 from a federal (non-EPA) block grant.

** funding amounts shown are for FY-84.

*** Source: U.S. Environmental Protection Agency - Office of Drinking Water, *A Management Assessment of Non-Community Water System Programs in Nine States*, September, 1985.

VETERANS ADMINISTRATION

STATEMENT OF DR. JOHN M. DENNIS, M.D., DEAN, UNIVERSITY OF MARYLAND SCHOOL OF MEDICINE

Senator GARN. Is Dr. Kenneth Shine here?

Then, Dr. John Dennis.

Dr. DENNIS. Good morning. I'm Dr. John Dennis, dean of the University of Maryland School of Medicine. I appreciate the opportunity to appear before you today to present the views of the Association of the American Medical Colleges on fiscal year 1987 appropriation for medical programs for the Veterans Administration.

With your permission, I would like to sumarize my statement and submit the full version for the record.

Senator GARN. Yes; certainly.

Dr. DENNIS. Mr. Chairman, my interest and those of the associations, and VA's medical programs stem from the highly productive relationship that was developed between the country's medical schools and the VA Hospitals at the end of World War II.

Affiliation agreements encompassing patient care, medical education, and research are now enforced in a 101 of the 127 medical schools and 133 VA medical centers.

The association certainly recognizes the financial difficulties plagueing our Government today and understands that the ever-increasing budget deficit must be dealt with. However, by the same token, we are aware of the extreme sacrifices the veterans who laid their lives on the line to protect our country.

The association firmly believes that we cannot, and must not, attempt to balance the budget on the backs of these veterans. Somehow money must be found to keep the VA medical program alive and responsive to the anticipated growing need for VA health care services for the coming year.

Increasingly, the needs of the veterans populations differ from those of the general public in that the majority of the veterans are self-referred for hospital care and present multiple medical problems and many are at or below the poverty levels, a reality that complicates post-hospitalization care.

I know from my own involvement with the Baltimore Veterans Hospital, we have looked at the economic status of the patients on several different occasions and found that somewhere between 65 and 75 percent of the veterans, on each occasion, either had no insurance or have had insurance which has been used and the veterans have been deposited in the VA hospital by the community hospitals.

Additionally, as you well know, the veteran population is growing older. By the year 2000, 37 percent of all veterans will be 65 years of age or older and 16 percent will be 75 years or older.

Older patients tend to require and consume relatively more health services and rarely have a viable alternative to hospital care.

With these demographics in mind, the association was deeply disturbed to learn that the President's budget calls for substantial funding and personnel reductions in the VA's medical program for fiscal year 1987. Funding levels for medical care, which has not increased in real dollars for 9 years, would be reduced by 2 percent despite the escalating cost of providing health care in the modern age.

The administration also proposes to reduce the VA staffing levels by 1 percent each year for the next 5 years in what are ironically called productivity increases.

In 1987 alone, this proposal would reduce the VA staffing levels by almost 2,000 people. By the year 1991, the total reduction would be an alarming 10,000 employees.

Additionally, as a result of a new proposal to treat fewer low-priority veterans, the administration would cut personnel levels by another 7,000 employees.

These drastic proposals, when coupled with the recently enacted means test, and the possibility of future Gramm-Rudman-Hollings sequestrations, raises the real possibility of a massive shrinkage of the VA medical care system and reduce quality of care at a time when the VA's medical mission should be increased to meet growing demands.

The Association of American Medical Colleges is also concerned over several other proposals in the administration's budget. The already low VA staffing ratio of employees per census would increase slightly to 2.86, although the comparable ratio, in non-Federal hospitals, is much higher, 3.78 in 1984.

The administration would allow only a modest $277,000 increase for the VA's 10 geriatric research education and clinical centers, despite recently enacted legislation that calls for an expansion in the number of GRECC's to 25.

This program should be bolstered substantially because of its unique role in developing innovative approaches to caring for the elderly.

The VA's renown medical and prosthetic research budget, which has not increased in constant dollars for the past 12 years, would be decreased under the President's budget and 147 employees and a number of meritorious research projects would be terminated.

Given that the administration has proposed a significant 25-percent increase for defense R&D and a 17-percent increase for R&D governmentwide in fiscal year 1987, the Association of American Medical Colleges believes that the proposed reductions in the VA's research budget are unfair and would thwart its ability to keep pace with the increasing costs and complexities of conducting biomedical research.

The administration has proposed a 40-percent reduction for the VA's major construction projects and at 22-percent cut for minor projects from the 1986 appropriated levels.

This undoubtedly will delay much needed construction, rennovation, and replacement projects in certain areas and threatens the VA's ability to deliver quality care in the coming decades.

In conclusion, the association would strongly urge this subcommittee to again take the lead in insuring the continued health and vitality of the VA medical care enterprise.

To accomplish this, the Association of American Medical Colleges would recommend that the VA's fiscal year 1987 appropriation include $9.7 billion for the medical care program and $193.5 million for the research program which its current services are based on the pre-Gramm-Rudman-Hollings 1986 level. For construction, we recommend sufficient funding levels and flexibility to allow the VA to, at least, replace or rennovate obsolete medical facilities such as the VA hospital in Baltimore.

Mr. Chairman, this concludes my statement and I would be pleased to answer any questions you might have.

Senator GARN. Thank you doctor.

Just one more administrative question. You said at the beginning of your testimony you represented 72 VA hospitals affiliated with 133 medical schools. Is there any——

Dr. DENNIS. I said 101 medical schools of 127 approved medical schools. There are 101 of the 127 affiliated with the 133 VA medical centers.

Senator GARN. I was just wondering if there was any particular reason you don't represent all of them.

What's the diffeence between affiliation and representing?

Dr. DENNIS. I am representing the association and, consequently, representing all the VA's affiliated therewith.

Senator GARN. Thank you, doctor.

Dr. DENNIS. Thank you very much.

[The statement follows:]

STATEMENT OF DR. JOHN M. DENNIS, DEAN, UNIVERSITY OF MARYLAND SCHOOL OF MEDICINE, ON BEHALF OF THE ASSOCIATION OF AMERICAN MEDICAL COLLEGES

The Association of American Medical Colleges (AAMC) appreciates the opportunity to submit its views to this Subcommittee for its consideration of FY 1987 appropriations for the Veterans Administration (VA). Since its founding in 1876, the Association has steadily expanded so that today it represents the whole complex of individual organizations and institutions charged with the undergraduate and graduate education of physicians. It serves as the national voice for 127 accredited medical schools and their students; 82 professional and academic societies, and 435 teaching hospitals, including 72 VA hospitals.

Currently, affiliation agreements are in force between 101 medical schools and 133 of the VA's 172 medical centers. The medical schools have assumed responsibility for operating the graduate medical education programs, i.e., residency programs, of the VA; as such, most of the senior professional staff of the affiliated VA hospitals have been recruited by, and been tendered faculty appointments in, the affiliated medical schools. The Association firmly believes that these mutually rewarding affiliations that have been in force since the end of World War II have made significant contributions to the health care of veterans as well as the rest of America's citizens. Jointly, the two entities conduct vital research programs in areas of specific importance to the veteran population, but also of considerable applicability outside the VA medical system. Veterans are the ultimate winners in this situation, as they can expect the highest quality of health care.

Unfortunately, these high expectations on the part of our nation's veterans may soon fade. The President's FY 1987 budget request for the medical care programs of the VA contains sharp reductions in current services as well as strict limits on future growth, despite the rapidly aging veteran population which will likely require and consume relatively more health care services. The AAMC, as well as almost every American, is aware of the financial difficulties plaguing our government today and recognizes that the ever-increasing federal budget deficit must be dealt with. However, by the same token, we are all very aware of the extreme sacrifices of the veterans who laid their lives on the line to protect our country. The Association firmly believes that we cannot and must not attempt to balance the budget on the backs of these veterans, an increasing number of whom are elderly and indigent. Somehow, money must be found to keep the VA medical program alive and responsive to the anticipated growing demands on the VA for health care services in the coming decades.

Medical Care

The Association was deeply disturbed to learn that the President has requested only $9.1 billion in FY 1987 for the VA's medical care program---$172 million, or 2 percent less than the level appropriated by Congress in FY 1986. In constant dollars, the VA medical care budget has not increased in 9 years, despite the escalating costs of providing health care over this period.

Perhaps even more alarming than the funding reductions, however, are proposals within the Administration's budget that would drastically reduce the number of health care professionals within the VA medical system. This year's budget request continues a disturbing proposal that began last year to impose a "productivity assessment" that will result in an annual one percent reduction in the VA's full-time-employee-equivalent (FTEE) complement for each of the next 5 years. The implicit policy is that productivity can be increased and personnel therefore can be reduced; whether or not the assumption is borne out by the facts, employment reductions consonant with it will be effected. This policy is expected to result in a total personnel loss by FY 1991 of 10,000 FTEEs, over and above the 1,306 FTEEs lost in FY 1986 due to Gramm-Rudman-Hollings sequestrations. The Association agrees with former VA Administrator Harry Walters that this productivity assessment "will ultimately result in a reduced quality of medical care" for our nation's veterans. At a time when the demand for VA medical care is expected to rise significantly until the year 2000, this Administration would take away the human resources that are necessary to provide that care.

Another proposal contained in the President's budget documents is one that proposes to treat fewer "low priority" veterans by curtailing medical services for veterans with non-service-connected disabilities. In FY 1987 alone, it is expected to produce "savings" of $351 million and to reduce VA medical personnel by another 7,000 FTEEs, while turning away 62,000 in-patient and 1.3 million out-patients from VA hospitals. This drastic proposal, when coupled with the means test recently enacted by Congress, raises the real possibility of a massive shrinkage of the VA medical care system. Many VA officials have predicted all of these reductions---the productivity assessment, the new means test, and possible future sequestrations of VA funding and manpower if Gramm-Rudman-Hollings prevails over the next five years---will result in significant mission changes for the VA, and may force the consolidation or even closure of some VA medical centers. The Association is deeply concerned that such mission changes will result in a significant diminution of the quality of VA medical care and may serve to thwart the substantial gains and growth the VA has enjoyed since the end of World War II.

The AAMC has other concerns regarding the impact of the proposed budget for VA medical care:

- The Administration's budget documents indicate that the staffing ratio of FTEEs per census in the medical bed sections of VA medical centers will increase by a scant .02 percent to a ratio of 2.86 in FY 1987. Even with this slight increase, the FTEE/census ratio in VA hospitals is still substantially lower than that in non-federal hospitals, which averaged 3.78 in 1984.

- The President's budget also contains a proposal to convert approximately 59 acute care beds to nursing home care beds, with concommitant reductions in expenditures and personnel, respectively, of $2.4 million and 70 FTEEs in FY 1987. This proposal reportedly is the first step in a 5-year effort to convert approximately 1400 actue care beds to long-term care beds by the year 1991. Though the AAMC recognizes the growing need for chronic care beds to accommodate the growing aging veteran population, we do not believe that it should be at the expense of the VA's acute bed capacity. The latter is not only critical to meeting current needs of the veteran population as discussed above, but also as an important back-up to our nation's military program. In light of the President's strong support for substantial increases for the Department of Defense, surely the VA's medical system could be viewed as delayed defense expenditures and should be spared the types of reductions that have been proposed.

- The FY 1987 budget request also contains only a modest increase of $277,000 and 1 FTEE to continue vital training and research at the VA's 10 Geriatric Research, Education and Clinical Centers (GRECCs), although Public Law 99-166 signed into law on December 3, 1985 mandated that the number of GRECCs be expanded to 25. The AAMC agrees with Congress' intent that this program should be expanded substantially, as it plays a significant role in developing innovative approaches to caring for the elderly and has encouraged many health care professionals to specialize in geriatric medicine, research and education. As the veteran population rapidly ages, there will be a great need for further research in such areas as Alzheimer's and Parkinson's diseases, the cardiomyopathy of aging, and age-related modifications in glucose-insulin metabolism, to name but a few.

The AAMC strongly recommends that the VA's medical care budget be funded at $9.7 billion in FY 1987, which essentially is current services based on 1986 pre-Gramm-Rudman-Hollings levels. We believe that this recommendation is prudent given the fact that all sources predict that the VA will face its biggest challenge ever in meeting the demands of aging veterans who require and consume relatively more health services but rarely have viable atlernatives to hospital care.

Education and Training

The AAMC is heartened that the Administration has not requested reductions in the VA's medical education and training program for FY 1987. The budget request proposes a funding level of $226 million for medical housestaff positions for the 1986-87 academic year. This level represents an increase of $8.6 million and 215 housestaff positions from the previous academic year, an important increase given the fact that the Administration had proposed substantial reductions in this program in its FY 1986 budget request. The Association wholeheartedly supports the education and training funding levels contained in the Administration's request.

Medical and Prosthetic Research

The medical research conducted by the VA represents a unique Federal intramural program in which clinician investigators focus on research questions directly relevant to the health problems of veteran patients. This research and development program of the VA complements the medical care and education components of the VA's three-pronged effort to improve and maintain the quality of health care provided to veterans.

Despite the importance and renown of this program, the Administration has once again proposed a reduction in the medical and prosthetic research account to $188.9 million in FY 1987, a reduction of $350,000 from 1986 approppropriated levels. Although the President's request would restore some of the cuts resulting from FY 1986 Gramm-Rudman-Hollings sequestrations, the proposed funding level would terminate support for 147 FTEEs and an as-yet undetermined number of research projects. The AAMC is distressed by this proposed reduction in VA research funding, particularly since the program has not increased in real terms for the past 12 years. The plight of the VA's research budget becomes even more poignant when one considers that the President's FY 1987 budget request proposes a substantial 25 percent increase for the R&D budget of the Department of Defense and a 17 percent increase for R&D government-wide.

The VA research enterprise is a vitally important national resource, one that has already sustained more than its fair share of retrenchments over the last decade. Thus, the AAMC urges that the Subcommittee approve at least a current services budget for the VA's medical and prosthetic research account. A current services level, based on 1986 pre-Gramm-Rudman-Hollings appropriations, would provide the VA with $193.5 million in FY 1987, allow the VA to keep pace with the increasing costs and complexities of conducting biomedical research in the modern age, and insure continued VA participation in the current revolution in biomedical research.

Construction

The quality of health care delivered to veterans is heavily dependent on the availability of up-to-date facilities and equipment; it is difficult to maintain high esprit de corps in ramshackle surroundings. Despite the essentiality of adequate facilities, however, the President has proposed a whopping 40 percent reduction in the VA's major construction program, and a 22 percent cut for minor projects. Such drastic cutbacks undoubtedly will delay much needed renovation and replacement projects in certain geographic areas and therefore threaten the VA's ability to maintain the staff morale so essential for quality health care.

The VA's 1984 report entitled "Caring for the Older Veteran," projects that "construction to meet all of the estimated 1990 service needs would require an increase of up to 140 percent in VA hospital beds, and an increase of up to 101 percent in VA-operated long-term beds during the five years after 1995." The Association believes that these projections on the magnitude of need in the coming decade mandates that sufficient funding and flexibility be provided to the VA to at least replace or renovate obsolete VA medical facilities.

Conclusion

There is no doubt that the veterans of this Nation rely heavily on the VA for high-quality medical care. Of necessity, this reliance requires the support of adequate numbers of staff, the maintenance of a viable biomedical research program, the provision of up-to-date facilities and equipment, and sufficient funding to make it all work. The AAMC urges this Subcommittee to once again take the lead in ensuring the continued health of the VA's medical care enterprise, and to approve an FY 1987 appropriation that reflects its continued commitment to this especially deserving population.

VETERANS ADMINISTRATION

STATEMENT OF PAUL S. EGAN, DEPUTY DIRECTOR, NATIONAL LEGISLATIVE COMMISSION, THE AMERICAN LEGION

ACCOMPANIED BY ROBERT E. LYNGH, DIRECTOR, NATIONAL VETERANS AFFAIRS AND REHABILITATION COMMISSION, THE AMERICAN LEGION

Senator GARN. Paul Egan and Robert Lyngh. Mr. Egan is the deputy director, National Legislative Commission, and Mr. Robert Lyngh, director, National Veterans Affairs and Rehabilitation Commission of the American Legion.

Please proceed, gentlemen.

Mr. EGAN. Bob Lyngh is the director of our National Veterans Affairs and Rehabilitation Commission and he will summarize our remarks. We're both prepared to answer any questions that you have, and certainly invite them.

Mr. LYNGH. Mr. Chairman, American Legion appreciates this opportunity to present it's views on appropriations for function 700 (veterans benefits and services) for fiscal year 1987.

In its submittal to Congress, the administration has proposed for the Veteran's Administration budget authority of $26.6 billion, down more than $408 million from fiscal year 1986 and budget outlays of $26.3 billion, down over $185 million from fiscal year 1986. Over $234 million in budget authority has been sequestered from the current year VA budget as a result of the President's order implementing Gramm-Rudman.

Therefore, it is necessary that comments on the adjusted fiscal year 1986 budget are woven throughout our entire statement which we trust will be printed in the record, to truly illustrate the impact that the dramatic reductions that have been proposed will have on benefits of services for veterans.

To preface the remarks we will make as to certain items in the funding proposals, it must be stated that the American Legion is totally committed to veterans and stands for full funding for veterans programs by which we mean there should be provision of such funds as are necessary to effectively carry out the programs that have been established by Congress. We support all those programs. Each of them had a purpose when enacted and each has been adequately justified as meeting a legitimate need of the veteran population.

Veterans are responsible citizens and the American Legion is a responsible organization. In that respect, we have shared the concerns of the executive and legislative branches of the Government about the ominous budgetary deficits that face the country.

In viewing this problem as responsible taxpayers, veterans have done more than their fair share, in our judgment, in acceding to reductions in Veterans Administration benefits and services.

During the 4 previous fiscal years alone, the savings to the Government that have resulted from these reductions have amounted to well over $1 billion.

I would like to interpolate there, Mr. Chairman, if I may, that since this administration came into office, at least six changes have been made in veterans programs which have reduced the cost of those programs to the Federal Government and the benefits provided to the veterans for whom they were intended.

The Veterans Administration has consumed a shrinking share of total Federal spending. As a matter of fact, the portion of the total Federal budget consumed by veterans programs has been declining consistently for the past 11 years.

In fiscal year 1975, the VA budget represented a full 5 percent of the total expenditures. I might interpolate there, Mr. Chairman, that fiscal year 1975 was the year in which the Government finally called an end to the Vietnam war following the removal of some 750,000 military personnel who were serving in that area.

In fiscal year 1975, the budget represented a full 5 percent of the Federal budget. In 1981, 3.2 percent, and in fiscal year 1986, before the Gramm-Rudman sequestrations, 2.6 percent.

The reasons for this are probably several, but there is one very important reason that must be understood clearly. Unlike most entitlement programs, VA programs generally, and rejustment programs specifically, are not open ended. Instead, they have built in efficiencies which guarantee percipitous declines in cost over a period of the years of the program.

From 1950 to the present, the veteran population has increased by approximately 18.5 million to nearly 28 million. We might interpolate there, Mr. Chairman, if we may, these increases are the result of military activities undertaken by the Government, not at the volition of the citizens who were asked to serve.

Two major GI bill programs have educated millions of veterans. A total of 22 major veterans health care measures were approved by Congress and 29 hospitals were added to the VA medical care system. During the same period of time, Federal outlays for veterans benefits and services have increased only by a ratio of 3 to 1 compared to 272 to 1 for social security; 131 to 1 for health; 114 to 1 for education, training, and employment social services; and 29 to 1 for income security. Outlays for Medicare are now 11 times the amount in fiscal year 1979.

Mr. Chairman, we feel that given the obvious restraint in Veterans Administration spending and in contrast to the increased cost of funding these other human resources programs, the VA budget has been a model of prudence, thus obviating the need for drastic and unacceptable changes in the agency and in the service it provides.

Thank you, sir.

Senator GARN. Well, you were here for my first speech, but I don't doubt your comparisons; they're correct. You pointed out where most of the rise in the Federal budget is come, it is coming in the entitlements programs, the automatically indexed programs, that's absolutely true.

But, I would only repeat, there is still a lot of waste there, if people would really dig into it and save some money. That's my message. I won't get started. You were here for my first comment.

Mr. LYNGH. Can I make one observation, Mr. Chairman?

Senator GARN. Certainly you can.

Mr. LYNGH. I certainly don't intend to engage the chairman in a dialog, in view of your time restraints.

I might offer the thought that our field service, that the American Legion maintains complete survey visits to more than 65 of the VA MC's each year. Copies of those survey reports, which are all problem oriented, are all filed with the appropriate congressional committees.

I would like to offer the thought that if some more attention to the contents of those reports were made, they would identify some of the problems you're talking about in the VA medical care system and would help the Government overcome some of those problems. I include, as a specific reference, if I may, that some of the problems that were incurred with the construction of the clinical addition at the Salt Lake City Hospital 4 years ago could have been avoided if some attention had been paid to the recommendations the Legion made at that time.

Senator GARN. We would be happy to have you submit those surveys to this subcommittee. I am not aware of having received them, but boy, if you got them, send them to us.

Mr. LYNGH. We send them routinely to the Veterans Affairs Committee. We would be more than happy to send them to this subcommittee.

Senator GARN. We would appreciate it, because they apparently have not shared them with us.

Mr. EGAN. I would like to just make one further point, Mr. Chairman.

Senator GARN. Certainly.

Mr. EGAN. In your earlier speech, you indicated an interest in hearing from a lot of different associations as to where cuts could be made. While we can't suggest to you specific examples of where you might begin to look, I think if you look at the rate of growth in the VA, by contrast, and the rate of growth in virtually every other domestic program, I think you'll find that a key is rate of growth.

Between fiscal year 1975 and fiscal year 1984, for example, the entire VA budget increased by 55 percent, while the total budget increased by 163 percent.

In medical care, the VA's medical budget, over the same period, increased by 141 percent, while Medicare increased by 377 percent.

So to underline what Bob was saying, in summary, the problem with VA isn't a question of asking for more. The question is, Is VA really responsible for the current deficit crisis that we face. I think if you look at the numbers, the trends over the course of several years, you'll have to conclude that VA is not responsible.

Senator GARN. Yeah, but you're still missing my point or not wanting to hear it. I don't dispute your characterization of the budget. I have made that speech many times about the entitlements and the gutless Congress who isn't willing to face up to those and dumps it all on the defense and nondefense discretionary programs which are getting squeezed too much in many places.

But, you know my attitudes about defense and how irresponsible I think the Congress is in what they're doing to the defense budget. But, I don't care what the level is, or what the percentage is with other programs, if you make the defense budget $300 billion or $250 billion, if you do it with across-the-board cuts and you do it by eliminating this program or that program, the waste is still there. It doesn't change the fat level. Whatever the VA budget is, you make those comparisons, but making fundamental changes in the construction program and priorities, whatever that level is, you're still not eliminating the fat and doing a better job with the dollars that we have available. If Congress is cutting too much, then it is incumbent upon those programs to try to do a better job with the dollars that are available.

We have become so accustomed to the Federal trough. I used to be a mayor and I have seen the attitude of mayors change. They used to run cities without it. Now they're yelling and screaming because this is cut back and that was cut back. Well, they weren't mayors before they had those programs and they could do a lot better job. I say that as a former mayor. We used to turn down Federal programs because I didn't want the strings and the guidelines and some of the waste that went with them, so I'm not disputing what you're saying, but that doesn't make a case for not trying to do the best job that you can with whatever the level of the dollars are.

That's true of defense. Toilet seats costing $600 ought to be done away with. That just gives the opponents handles to grab on to to go out and take 5 or 10 percent across the board.

That's all I'm talking about. You know, it's sort of like—and I'm getting myself behind schedule now—but it's sort of like in the development of automobiles, you know. Now I drive a car with power windows and power door locks and all sorts of things. I couldn't stand a car without those any more. I mean, I couldn't live without my power door locks. They're so convenient and handy; and air conditioning and all that went with it. But you know, most of the years that I drove cars, I didn't have those things. The old case of once you had something, you just can't possibly—it becomes a necessity and I have seen that happen in my home. I see it happen in Federal agencies with things that are nice to have. You don't want to give them up; I understand that. But we don't do a very good job in any agency of prioritizing and doing what is really necessary and valuable in hitting those programs in the VA, the health care programs and should, because there's a lot of things that are going on out there that ought to be trimmed back and cut and you may be right, if we had seen those reports.

That was a ridiculous fiasco in Salt Lake City. It was just absolutely ridiculous what they did, right under the nose of the chairman in my own hospital in Salt Lake City. Inexcusable to waste money the way they did on those operating suites out there.

That's what I'm trying to get at and not cut your programs overall or across-the-board cuts with automatic reductions or dispute that you're not getting as much as you used to in comparison to somebody else. But those dollars could have been used taking care of some veterans in other areas. That's the point I'm trying to make.

Mr. EGAN. The veterans—I think the last place to look for an argument as to the fact that there is waste in Federal programs is the veterans community. Certainly there is waste in the VA. But, from our standpoint, the best we can do is recommend to you, from the standpoint of what makes good policy sense. I don't know that it's going to be possible to completely eliminate waste in Federal spending. I can tell you——

Senator GARN. Oh, of course it is not.

Mr. EGAN. It's the nature of government, part of it.

Senator GARN. Of course it is not. It is not possible to eliminate waste in the private sector either. The private sector isn't as efficient as some people would like you to believe, as we found out during the 1982 recession. How much leaner they are now; but you certainly try and minimize it.

Mr. EGAN. One of the very best examples of that, Mr. Chairman, is the fact that over the course of the period that health costs have sky rocketed through the roof. That hasn't been the same phenomenon with VA. VA has made do with what they have been given. Under Medicare or Medicaide in the private sector, someone gets care in a private-sector facility and, at least, until prospective payments and some of the other restrictions that have been imposed, the Government simply paid what was charged.

Mr. LYNGH. And all through those years they have increased the number of veterans, patients taken care of. That's an important point.

Senator GARN. Thank you, gentlemen.

[The statement follows:]

JOINT STATEMENT OF PAUL S. EGAN, DEPUTY DIRECTOR, NATIONAL LEGISLATIVE COMMISSION, THE AMERICAN LEGION, AND ROBERT E. LYNGH, DIRECTOR, NATIONAL VETERANS AFFAIRS AND REHABILITATION COMMISSION, THE AMERICAN LEGION

The American Legion appreciates this opportunity to present its views on appropriations for Function 700 (Veterans Benefits and Services) for Fiscal Year 1987.

In its submittal to Congress, the Administration has proposed for the Veterans Administration, Budget Authority of $26.615 billion, down more than $408 million from Fiscal Year 1986, and Budget Outlays of $26.353 billion, down over $185 million from FY 1986.

Over $234 million in budget authority has been sequestered from the current year VA Budget as a result of the President's order implementing Gramm-Rudman. Thus the funding levels reflected in this statement for FY 1986 on which the changes for FY 1987 are based on the revised/reduced figures. Therefore, it is necessary that comments on the adjusted FY 1986 budget are woven through this statement to truly illustrate the impact the dramatic reductions that have been proposed will have on benefits and services for veterans.

To preface the remarks we will make as to certain items in the funding proposals, it must be stated that The American Legion is totally committed to veterans, and stands for full funding for veterans programs; by which we mean there should be provision of such funds as are necessary to effectively carry out the programs that have been established by Congress. We support all of those programs. Each of them had a purpose when enacted, and each has been adequately justified as meeting a legitimate need of the veteran population. We are not aware of any programs at present that are superfluous or redundant; and therefore, we support all veterans programs that are now functioning.

Veterans are responsible citizens and The American Legion is a responsible organization. In that respect, we have shared the concerns of the Executive and Legislative branches of the Government about the ominous budgetary deficits that face this country. In viewing this problem as responsible taxpayers, veterans have done more than their fair share in acceding to reductions in Veterans Administration benefits and services. During the four previous fiscal years alone, the savings to the Government that have resulted from these reductions have amounted to well over a billion dollars. We will address the declining portion of the total Federal Budget consumed by veterans programs later in this statement.

Mr. Chairman, in past years when commenting on Function 700 funding, we have been guided by the Report of the Committee on Veterans Affairs to the Committee on the Budget. However, because of the fact that the Veterans Affairs Committees submitted two separate reports to the Budget Committee containing the majority and minority recommendations, we shall offer comment to areas of special concern we have identified through our own general oversight of the impact of veterans programs on those they are intended to serve. Reference will also be made to the Administration's proposal and the previously mentioned reports.

DEPARTMENT OF VETERANS BENEFITS

The direct benefit programs administered by VA through the Department of Veterans Benefits will consume 58.9 percent of the total VA Budget. These are, for the most part, the entitlement programs that must be funded, and they are meeting the real needs of the veteran population they are intended to serve.

These benefits are administered through 59 regional offices. The proposed budget reflects an increase in average employment in DVB of 400 FTEE. However, this figure includes a proposed transfer of 362 FTEE from the Office of Data Management and Telecommunications (ODM&T) into the Department. Thus, the actual increase for DVB projected for FY 1987 is 38 FTEE.

Mr. Chairman, since FY 1979 the average employment in the Department of Veterans Benefits has been reduced by 5,476 FTEE, including 918 that were cut in the current fiscal year. Of the 918, Gramm-Rudman accounted for 431 of those positions lost this year.

The proposed level of employment for FY 1987 would be 12,790, which includes the 362 FTEE from ODM&T.

The American Legion must again advise this Subcommittee that the Department of Veterans Benefits cannot continue to accept consistent and persistent personnel reductions year after year. This will inevitably impact on the ability of DVB staff to complete action on cases and disburse benefits, and thus severely hamper the delivery of services to VA beneficiaries. The timely delivery of benefits to veterans, their dependents and survivors is the most important responsibility of the Department, and the quality of work performed by personnel assigned to DVB determines to a great extent whether beneficiaries do in fact receive the benefits to which they are entitled by law. The American Legion's concern is projected from the standpoint that VA beneficiaries are either those with service-connected disabilities, their survivors or the aged and infirm seeking pensions. All are persons who very much need the benefits they are seeking, many on an urgent basis.

We firmly believe the Subcommittee should press for precise data and information from VA before inflicting further loss of field personnel on the Department of Veterans Benefits. The American Legion is not convinced that the Department of Veterans Benefits can operate effectively or efficiently at the projected level of employment. Therefore, we are currently surveying our own Department Service Officers to determine its effect on the delivery of benefits.

With respect to a specific benefit, the Administration has proposed a change in the eligibility criteria for the plot allowance, to make it consistent with the eligibility requirements for basic burial allowance. The American Legion is adamantly opposed to this idea. We feel that Congress made a mistake when it restricted the criteria for burial allowance. We urge that the Subcommittee approve appropriations sufficient to carry out the provision of the plot allowance at the current level, rather than that proposed by the Administration.

We would like to offer comment on another matter that falls within the Department of Veterans Benefits. Neither OMB nor CBO contemplates any need for new appropriations in Fiscal Year 1987 for the VA Home Loan Program. This means self sufficiency of this particular VA program has a built in savings of over $360 million compared to Fiscal Year 1986. It will be recalled in that regard that appropriations of $200 million were made necessary by high foreclosure rates and VA's slow rate of resale of properties in its foreclosure inventory. Added to this is the addition of an estimated $160 million in revenues generated by the 1 percent user fee this year alone.

Because interest rates have fallen precipitously, veterans have flooded the housing and lending markets to purchase or refinance properties. With little change in interest rates projected, it is assumed these revenues will continue at high levels during the next fiscal year.

VETERANS JOB TRAINING

The Veterans Job Training Act (VJTA) was extended last January, P.L. 99-238, at an authorized rate of $65 million. Since that time both the House and Senate Veterans Affairs Committees, in their respective reports to the Budget Committees, have recommended that this funding be provided in supplemental fiscal 1986 appropriations. Should the full amount authorized fail to be approved in a 1986 supplemental, the Legion urges the balance to be approved in regular FY 1987 appropriations.

DEPARTMENT OF MEDICINE AND SURGERY

The American Legion is very much aware that the most sensitive area of the Veterans Administration Budget is the medical care program. The reason for this is that unlike the entitlement programs that are statutory in nature, the strength and efficacy of the medical care program depends directly on the appropriation of funds by Congress.

The Administration's proposal for medical programs for FY 1987 is slightly over $9.3 billion, representing 36.5 percent of the total VA Budget. This represents a decrease of more than $25 million below the current fiscal year funding.

Direct medical care consumes the largest part of this funding at slightly over $9 billion. Under this proposal the funding for direct medical care would be decreased by over $46 million below the FY 1986 level, which was decreased by $117.6 million due to Gramm-Rudman. Thus the proposed medical care funding for FY 1987 is actually $161.6 million below the amount that was included in the original FY 1986 budget.

Medical care funding over the past several years has been increased only marginally, and has not kept up with the rate of inflation. The level of funding for patient care proposed for FY 1987 is not acceptable to The American Legion. The proposed reduction in funding would severely hamper the ability of VA to provide quality health care to veterans. The hard fact is that if present trends continue, the system, as we have it now, is going to be dismantled.

The Administration's budget also includes a net personnel reduction of 7,542 FTEE in medical care. The Gramm-Rudman adjustment in FY 1986 effected a reduction of 1,306 FTEE for a total proposed loss of 8,848 over the original employment level for FY 1986.

Mr. Chairman, personnel reductions based on inadequate funding and the implementation of programs such as the reduction of grade GS 11 through 15 positions in the Department of Medicine and Surgery have already had a severe impact on the VA's ability to provide quality medical care to veterans. The medical care system cannot absorb the reductions that are being insensitively forced upon it by OMB, and the staffing situation now existing within the system is critical. Morale is low. Recruitment and in many cases retention of employees in some critical positions has become almost nonexistent because of the lack of potential for promotion. DM&S is already reeling under the impact of the illogically conceived grade reduction initiative.

The American Legion strongly urges the Subcommittee to restore 8,848 FTEE over the level proposed by the Administration, and add approximately $355 million in budget authority over the proposed medical care account to support these FTEE in FY 1987. Although this restoration would not repair all of the damage that has been done, it would bring the staffing level up to FYs 1985 and 1986 (pre-Gramm-Rudman) staffing. This addition would place medical care staffing at 193,941 FTEE. This is the level at which the Appropriations Committees decided funds should be appropriated during the current year, and in FY 1985.

The proposed maintenance of average operating beds in the VA system reflects a loss of 2,700 acute care beds, no change in domiciliary beds and an increase of 500 nursing home beds, for a net loss of 2,200 beds.

The number of acute care beds within the system has continually eroded over the past several years, despite the precautionary statements presented by The American Legion that there should be no further reductions. Since FY 1981 4,900 acute care beds have been eliminated - and that does not include the decrease of 2,700 beds proposed for FY 1987. As we have stated, this is a particularly bad time to be eliminating acute care beds, when aging veterans are increasingly experiencing catastrophic illnesses. Older persons almost always require treatment for an acute episode prior to the need for long-term care. It is obvious that there is a need for more long-term care beds in the system. However, that does not connote a decreasing need for acute care beds. The VA medical care system must maintain a substantial number of acute care beds if it is to retain its ability to meet the full mix of treatment needs required of it by its primary mission, and its ability to fulfill the agency's assigned mission as the principal contingency back-up to the Armed Forces medical programs in case of a national emergency or an outbreak of hostilities.

We are supportive of the proposed increase of 500 nursing care beds, which brings the system-wide total to 11,700. Nursing care beds in the VA system are always in demand, and there is usually a waiting list. A consistent increase in nursing care beds is strongly indicated.

We note that the beneficiary travel program is targeted for a reduction of over $95 million, and the program is to be "reformed" to provide reimbursement only for emergency transportation such as ambulances, air ambulances and wheelchair vans. We are extremely concerned that this will prohibit many poor veterans who do not reside near a VA facility from receiving needed medical care.

Medical and Prosthetic Research

An increase of $7.8 million in research funds is projected for FY 1987, up to $188.9 million. It should be noted that the original appropriation for medical research in FY 1986 was reduced by $1.5 million as a result of Gramm-Rudman.

Included in this research proposal is nearly $3.5 million for the continuation of the Centers for Disease Control studies on Agent Orange, Vietnam Experience and Selected Cancers.

The Medical and Prosthetic Research Program in the Department of Medicine and Surgery is of special interest and concern to The American Legion. This is because we are keenly aware of the importance of research in the triad of the VA health care program: clincial care, education of health manpower, and research. None of the three elements can thrive without the presence of the other two. It is unquestionable that VA cannot continue to provide high quality medical care to veterans without a strongly funded research program. Much of the research in which VA engages is basic research that is advantageous not only to veterans, but to all mankind. Equally important is the fact that a strong and viable research program ensures the recruitment and retention of high quality physicians into VA service.

A projected summary of average employment reflects a loss of 147 FTEE in Medical Research, and increases of 20 and 25 FTEE in Rehabilitation Research and Health Services Research, respectively, for a net loss of 102 FTEE. The budget document does not reflect how these losses are to be accomplished, but we are extremely concerned, especially because this appears to be a trend. In FY 1985 there were 4,551 FTEE in research, as compared to 4,266 projected for FY 1987. We maintain that there is a need not for a reduction, but for an increase in available personnel for VA research activities. The Federal Government could make no wiser an investment than ensuring a vigorous and viable VA research program that benefits the entire American people.

Grants for Construction of State Extended Care Facilities

An increase of $21.5 million, up to $42.4 million is proposed for grants for construction of State Extended Care Facilities.

We are extremely aware of the importance of the services provided by State Homes, in that they have substantially reduced the burden that otherwise would have been borne by the Veterans Administration.

As of May 1985 there was a total of 47 facilities and 3 annexes located in 34 states.

The American Legion considers this program a wise investment, and when considering the current efforts to reduce Federal spending, the role of the State Homes becomes even more significant.

The FY 1987 request will provide for four projects which will produce 120 nursing home, 126 convertible and 150 domiciliary beds, as well as 12 non-bed producing renovation projects in eight States.

In examining this program we note that there is currently a backlog of 68 projects representing requests for grants of over $183 million. What this means is that if a State submits a request for a grant for funding of a project today, it may receive funds five to six years in the future. As we move into the period of an aging veteran population that will be with the nation for the foreseeable future, the States can be of major assistance to the Federal Government in caring for this population through State Extended Care Facilities. However, in order to materially ease the pressure on the VA, adequate funding must be provided to the States so that proposed projects may be completed.

The American Legion realizes that the proposed increase in funding for FY 1987 will be helpful. However, in view of the backlog of requests, we question whether it is sufficient. Many States are taking positive steps to care for their aging veteran populations, a fact that is most commendable. However, it deserves the full support and encouragement of the Federal Government. This program is a most effective way for the Federal Government to meet its obligation to veterans.

Grants to the Republic of the Philippines

The Budget Message provides a grant of $500 thousand to the Veterans Memorial Hospital in Manila to replace and upgrade equipment and to rehabilitate the plant and facilities. This grant has been made by the United States consistently since the end of World War II. The Veterans Memorial Hospital cares for many Filipino veterans who served in the Allied cause during WWII. There is certainly an obligation by this country to continue to show our gratitude and concern for them. The American Legion has always supported this grant, and continues to do so.

MEDICAL CONSTRUCTION

The Administration's Budget recommends a reduction in the medical construction program of $331.9 million down to $415.5 million, for FY 1987. That figure includes $57 million of prior budget authority that is being reprogrammed from the major working reserve.

Mr. Chairman, so far as The American Legion is concerned, this proposed construction budget is anemic to the point of starvation.

As we have stated for the past several years, it is just not wise to drastically reduce the funding for medical construction when the capital plant of the VA health care system is deteriorating. It seems that the Office of Management and Budget has it in mind to allow the system to continue to deteriorate through underfunding of the renovation and replacement program, which is one of the primary reasons for the current state of degeneration.

What happens then? Is it OMB's intention to reduce the system until there is none?

The American Legion believes very strongly that it is important to maintain the capital plant of the VA medical care system, and that adequate funding must be provided to upgrade and replace existing facilities.

The projects that are included in the major construction proposal are a replacement medical center in Baltimore; a replacement medical center in Augusta, GA; bed replacement and modernization at the Dayton, Ohio VAMC; fire and safety improvements at Wood, WI; environmental improvements, patient and nursing home care buildings at North Chicago; outpatient, clinical and nursing unit addition, Salem, VA; geropsychiatric building, Salisbury, NC; electrical distribution, Salt Lake City, renovate buildings 10 and 90, Waco, TX; and a research and education building, White River Junction, VT.

We must say that we are extremely pleased that the Administration has finally come around to the point of view that has been espoused by The American Legion since the mid 1970's with respect to the need for a replacement hospital in Baltimore. There is no question that it is badly needed and long overdue.

We are extremely concerned about the Administration's "plan for the future" that dictates no new independent nursing home care unit construction, and greater reliance on State Veteran Homes and community nursing homes. The nursing care formula currently in use consists of 40 percent VA, 40 percent State Homes and 20 percent private sector nursing homes. The new plan calls for 30 percent VA, 40 percent State Homes, and 30 percent private sector facilities.

This proposal of a new long-term care policy that emphasizes the use of community nursing homes is not really a new concept. The American Legion has opposed this idea in the past for several very good reasons. We do not disagree that community nursing homes play an important role in VA's effort to provide nursing care to veterans. However, there are certain postulates that must be taken into consideration.

It has been stated by some that the costs of constructing and operating VA nursing home care units are higher than those in the private sector. It must be realized that these government owned and operated facilities have rigorous obligations placed upon them to provide optimum quality medical care to veteran patients. Ongoing oversight is provided by the Congress, The American Legion and other veterans organizations, and by the VA itself through its Professional Services. Community nursing homes are not subjected to such thorough and constant policing. In addition, the VA nursing home patient load has a high percentage of veterans who because of the care they require are frequently not acceptable to community nursing homes. Veterans in VA nursing home care units are usually sicker and stay longer than individuals in private sector nursing homes and, therefore, they require more specialized facilities and equipment for their care. The community nursing homes are commercial ventures and many times refuse such cases because they are not profitable.

As for the replacement and renovation projects scheduled for FY 1987, it is distressing to see that only two replacement hospitals are included in this projection. The Office of Management and Budget is only fooling itself by delaying the funding for badly needed projects. This is false economy, pure and simple, and will end up costing more in the long run, rather than saving the Government money, because the longer the projects are delayed the more it will cost to build them. And in the meantime the capital plant continues to decay.

Mr. Chairman, The American Legion urges the Subcommittee to consider restoration of at least $35 million in order to provide for a number of high priority medical construction projects that were scheduled for FY 1987. These projects include examples such as nursing home units at the Hampton, Virginia and Tampa, Florida VA Medical Centers; and site aquisition for a VA hospital in Palm Beach County, Florida. In addition, the funds would be available for the most critically needed facilities in order that a reasonable rate of replacement and renovation may continue.

Another issue that we feel is deserving of consideration is the provision of parking at VA medical care facilities. At times this issue is given low priority as some feel that it is a small concern in the overall scenario of providing medical care to hospitalized veterans. However, The American Legion does not share that opinion.

In many instances, particularly in urban areas, adequate parking facilities can make the difference as to whether or not medical centers are able to recruit and retain qualified medical care professionals. Equally as important, the availability of facilities at which to park an automobile may be the determining factor as to a veteran's ability to seek and receive needed medical treatment. This is especially true in the case of a veteran who is undergoing a regimen of regularly scheduled outpatient visits. In addition, hospitalized veterans are entitled to visits by their families and friends. This is particularly important in the case of a veteran that is hospitalized with a terminal illness.

EXCESSING OF VA LAND

Included in the Budget proposal submitted to Congress by the Administration is notice of intent to declare excess and transfer to the General Services Administration, 109 acres of land that are presently part of the complex that comprises VAMC West Los Angeles, VAMC Brentwood, the VA Domiciliary and the National Cemetery operated by the VA Department of Memorial Affairs. This entire complex includes a total of 545.5 acres.

The original grant of the land that comprises these various VA activities was made in a deed executed by the owners of the land in the year of 1888. The land was gifted by the owners to the Federal Government to be used for the construction and operation of a Home for Disabled Volunteer Soldiers. Such a home was constructed and maintained, and through the years the original activity has changed, expanded and been modified until we see that today the entire complex comprises a variety of activites carried on by VA for veterans.

As the City of Los Angeles has expanded the land comprising the VA complex at West Los Angeles has become exceedingly valuable real estate. We can attest that all the VA land is coveted by the City of Los Angeles, by the University of California at Los Angeles (UCLA), and by developers who could make millions of dollars if they could gain control of that land, or any part of it.

The American Legion of California has long entertained an apprehension, shared by the National Organization of The American Legion, that sooner or later a move would be made to attempt to gain control of some or all of this land, as it is described in these paragraphs. We see in this initiative to transfer 109 acres of the land to GSA, the first move in this direction. The value of the land in Los Angeles County being what it is and human avarice being what it is, there is no way some move would not be made to dispossess sick and disabled veterans from such valuable land to the end of putting alot of money in somebody's pocket - here we refer to developers.

If the transfer proposed in this budget initiative is accomplished, we of the Legion have reason to believe that the heirs and descendants of the owners who gave the land to the U.S. for the specific purpose of caring for sick and disabled veterans may very well undertake court action to invalidate the original deed and reclaim the entire complex of land. The resulting value of such an action, if successful, would be profitable to the claimers beyond the wildest imagination of most of us.

It is the earnest hope of The American Legion that the Committees of Congress having oversight responsibility for the welfare of the nation's veterans will not permit the proposed transfer of land to take place. The American Legion will continue to oppose the transfer of any portion of the land herein discussed to anybody, for any purpose other than to continue to provide care for veterans.

In addition to that, we wish to state for the record that the complex of land described herein encompasses a wide variety of activities for the care of perhaps the largest single concentration of veterans to be found in the nation. There is no possibility that the scale of veterans activities now being carried on at West Los Angeles will be in any way scaled down for the foreseeable future.

DEPARTMENT OF MEMORIAL AFFAIRS

The funding proposal for the Department of Memorial Affairs reflects an increase of slightly over $2.2 million up to $44.2 million for FY 1987. An additional $3.6 million is identified for cemetery construction projects which is down $6.9 million from this fiscal year. The projected average employment for FY 1987 is 1,189 which reflects an increase of 13 FTEE.

The American Legion feels that the proposed funding for the Department of Memorial Affairs appears adequate. We totally support the construction program that is underway. We continue to work with the Department in attempting to acquire land for the expansion of existing national cemeteries.

It is our perception that the total Memorial Affairs program is progressing in a satisfactory manner. We are convinced that the program has improved immeasurably since it was placed under the jurisdiction of the Veterans Administration. We commend the progress that is being made, and trust that the Congress will continue to support VA's plans with the modest funding required to carry out this program.

Conclusion

Mr. Chairman, in this statement we have set forth the positions of The American Legion on a variety of subjects that are included in the Budget Message of the Administration for the VA which we consider to be of special importance to the nation's veterans. We have spoken to those programs we believe to be of highest priority in an agency whose activities are all of high priority, because they are intended to respond to the needs, first of those who were disabled in war service, and then to the reasonable needs of all those who served honorably when called to do so by the nation.

As has been stated to this Subcommittee on prior occasions, is is the position of The American Legion that when the national priorities are established, funding for veterans programs should rightfully rank second only to national defense.

We feel it important to illustrate an additional perspective from which to assess the fiscal merits of veterans programs and thereby justify the size of the appropriations that are needed to adequately fund them.

The Veterans Administration has consumed a shrinking share of total Federal spending. As a matter of fact, the portion of the total Federal Budget consumed by veterans programs has been declining consistently for the past eleven years. In FY 1975 the VA Budget represented a full 5 percent of the total Federal expenditures; in 1981 - 3.2 percent, and in FY 1986 - before the Gramm-Rudman cuts - 2.6 percent. The reasons for this are probably several, but there is one very important reason that must be understood clearly. Unlike most entitlement programs, VA programs generally, and readjustment programs specifically, are not open-ended. Instead, they have built-in efficiencies which guarantee precipitous declines in costs. The G.I. Bill education program is a classic example. In FY 1975, the cost of VA education was $4.6 billion, and by FY 1984 it had dropped to $1.4 billion. During the current fiscal year the cost of this program will be approximately $877.6 million, and for FY 1987 it estimated that it will cost $741.2 million. It is obvious from these figures that the cost of VA education is rapidly declining.

From 1950 to the present, the veteran population has increased by approximately 18.5 million to nearly 28.0 million. Two major G.I. Bill programs have educated million of veterans. Twenty-two major veterans health care measures were approved by Congress, and 29 hospitals were added to the VA medical care system. During the same period of time, Federal outlays for veterans benefits and services have increased only by a ratio of 3 to 1 compared to 272 to 1 for Social Security; 131 to 1 for health; 114 to 1 for education, training, employment and social services; and 29 to 1 for income security. Outlays for Medicare are now 11 times the amount in FY 1970.

Mr. Chairman, we feel that given the obvious restraint in Veterans Administration spending in contrast to the increased cost of funding these other human resource programs, the VA budget has been a model of prudence, thus obviating the need for drastic and unacceptable changes in the agency and in the services it provides.

Mr. Chairman, we appreciate this opportunity to present the views of The American Legion.

STATEMENT OF DR. KENNETH SHINE, M.D., PRESIDENT-ELECT, AMERICAN HEART ASSOCIATION

Senator GARN. Doctor Shine.

Dr. SHINE. Mr. Chairman, thank you for the opportunity of appearing, and I also apologize for the delay. We were in another committee hearing.

Senator GARN. I understand.

Dr. SHINE. I am Dr. Kenneth Shine dean-designate of the UCLA School of Medicine and president-elect of the American Heart Association.

As a dean, I am particularly proud of the fact that we're unique among American medical schools in having three veterans hospitals associated with us—Wadsworth, Sepulvada, and Brentwood.

In response to the chairman's comments, I would just like to emphasize that we are also concerned about costs. I am pleased to report, for example, that we participated in the consolidation of administration between two of those VA hospitals to reduce costs. We took over a contract to pay house offices there in order to reduce salaries. We pioneered in the Geriatric Assessment Unit at Sepulvada which showed the cost effectiveness, for the first time in American medicine, that if you assess geriatric patients in an appropriately set up unit, that you could cut cut the cost of hospitalization and readmission. That's a prototype program.

And that we also have substantially decreased the length of stay at the Wadsworth VA Hospital.

So, although I am going to comment primarily about research issues, I wanted to emphasize that we share your concern about the issues of the efficiencies of operation and the improved care of patients within the VA system.

As president-elect of American Heart, I would point out that cardiovascular disease continues to be the most important cause of death in the United States. It costs somewhere in the range of $102 billion a year in the United States today, but I would also point that between 1964 and 1984, we have had approximately a 39-percent decrease in the rate of morbidity and mortality from cardiovascular disease, and that's big dollars.

If, in fact, the death rate hadn't come down, we would be spending $170 billion, and that $68 billion difference I characterize as the silent savings that have occurred from scientific success in reducing death and disability, both from treatment and from prevention.

The Veterans Administration medical research program, and particularly its cardiovascular research support, is only a very small portion of the overall VA budget. But, we believe it deserves the strong support of the Heart Association and the Congress because of its very key significance.

The administration's fiscal 1987 budget includes $164.4 million for the medical research program, a 3.2-percent increase over fiscal 1986, adjusted for Gramm-Rudman.

The President's fiscal 1987 request is 2½ percent below the level appropriated for the program by Congress in fiscal 1986.

The following components of the program are of concern to the American Heart Association. Investigator initiated research which, under the President's budget, would receive a 3.5-percent increase.

Under the President's budget, cooperative studies programs would receive a 13-percent increase. Key cardiovascular investigations in this program include studies on the effects of platelet therapy on grafts and VA researchers have, in fact, pioneered in the assessments of cardiovascular surgery. Studies on carotid stenosis and carotid stroke, which are really very critical and, in fact, very difficult to do except out in the VA system and a study comparing the efficacy of angioplasty and bypass surgery in the treatment of patients with arteriosclerosis of the lower extremities.

Under the administration's budget, career development awards would be increased by only 3.6 percent. Although the President's budget includes increases for each of the program mechanisms described, they also include a 4-percent decrease that is minus 147 in FTEE's proposed for the research program.

This is of particular importance because when you cut FTEE's, they tend to get cut from the most recently funded individuals, from young people, from individuals who commonly have a single technician, and I can tell you from my own experience, just looking at the first 4.3-percent round, that this has had a dramatic impact on individual investigators.

The Heart Association believes that these reductions are shortsighted in light of the needs of the veterans hospitals to prepare for the future needs of veterans. Two out of every three elderly males will be eligible for VA medical care by the year 2000.

While the emphasis in the VA research budget is clincial, it should be pointed out that the research budget is essential to our ability to recruit and maintain the best and the brightest young physicians to work in the veterans hospitals. Not only to do research, but also to care for veterans and to teach residents.

The VA is less unique than the rest of the system in that it suffers many of the same problems that pervade our entire research community.

Obsolete research equipment, outdated laboratory and animal care facilities; we urge the subcommittee to to give consideration to these issues.

The Heart Association is keenly aware of the need for fiscal restraint, however, we are concerned about the potential negative impacts on the health of the Nation if cutbacks in biomedical research programs are not sufficiently made up in fiscal 1987.

Although the President's budget includes a slight increase for the medical research program, we do not believe that it goes far enough. Therefore, we recommend an appropriation of $186.4 million for fiscal 1987 for the VA medical research program. This would allow for 10.6

percent increase over fiscal 1986 appropriated level for research and would help to insure the continuation of the current research momentum in disease and maintaining the VA's role.

Moreoever, it is absolutely essential in order that we be able to recruit the best and brightest among our physicians to work in the veterans hospitals.

Thank you, Mr. Chairman. I would be pleased to answer any questions that you might have.

Senator GARN. Thank you, Dr. Shine.

Is it possible to replace obsolete research equipment you have mentioned by implementing a new program that is similar to the committee's Advanced Technology Equipment Program where half the funds have to be matched by sources outside the Federal Government?

Dr. SHINE. Yes, sir; it is possible to do that and, in fact, we have had experience in Los Angeles, through the University of California at Los Angeles, we have been able to raise private money in order to contribute to care of veterans.

For example, we have a cyclotron facility, a positron emission tomography facility at the Johnson facility, which is, in fact, a joint venture in which private money was contributed. In addition, we have been able to obtain money from the National Cancer Institute for the cyclotron facility, as well as using university money.

We think that there are a lot of opportunities, provided there are some resources on the veterans side to couple those moneys with moneys in the university side and in the NIH side to benefit veterans.

And, I think, the experience at Wadsworth, where we have been particularly effective in this area would be a good example of those accomplishments.

Senator GARN. Thank you, Doctor Shine, very much. We appreciate your coming.

Dr. SHINE. Thank you, sir.

[The statement follows:]

STATEMENT OF KENNETH SHINE, M.D., PRESIDENT-ELECT, AMERICAN HEART ASSOCIATION

I am Dr. Kenneth Shine, Dean of the UCLA School of Medicine, and President-elect of the American Heart Association. I appear today on behalf of the AHA's 120,000 volunteers, 40,000 scientific members and over two million program and fundraising volunteers. I am very pleased to have this opportunity to offer the following comments and funding recommendations regarding the Veterans Administration's Medical Research Service (MRS) program.

Cardiovascular disease is responsible for almost one million deaths each year. Currently it is estimated that over 63.6 million Americans have one or more forms of cardiovascular disease -- high blood pressure afflicts an estimated 57.7 million individuals; 4.7 million have coronary artery disease; 2.1 million suffer from rheumatic heart disease; and over 1.9 million Americans have suffered a stroke. Heart disease, stroke and related disorders account for almost as many deaths as all other causes of death combined. In addition, there is growing evidence that shows the incidence of heart attack may no longer be on the decline. In 1986, the total economic costs associated with cardiovascular disease are estimated to be over $102 billion in direct medical expenses and lost output due to disability and death. However, there is encouraging evidence that we are making progress against these diseases. Between 1964 and 1984 the death rate for all cardiovascular diseases declined by 39 percent.

There are many reasons for this encouraging trend: a greater stress on preventive medicine; a higher level of awareness and concern on the part of the general public regarding healthy lifestyles; and most importantly, remarkable research breakthroughs in the cardiovascular field, and the translation of these important findings into clinical practice. These research advances not only save lives and improve medical treatment of patients with cardiovascular disease, but result in a significant savings of tax dollars as well. It has been estimated that for each dollar spent in biomedical research, there is a return of $10 to $16 in reduced illness and medical costs due to increased life expectancy. Specific examples of advances in the cardiovascular field which have lead to significant cost savings are advances in coronary artery surgery research and percutaneous transluminal coronary angioplasty (PTCA) which have resulted in annual net savings to the nation of over $654 million.

The Veterans Administration Medical Research Service (MRS) program, and in particular its cardiovascular research support, makes up a small portion of the overall VA budget, however, we believe that it deserves the strong support of the AHA and the Congress as well. While the primary purpose of the VA health care system as a whole is the provision of high quality health care services to eligible veterans, the research supported by the VA Department of Medicine and Surgery is part of the total health care system of this country -- discoveries resulting from VA-supported research benefit science and this Nation's health as a whole.

In addition, research findings are helpful in meeting the changing needs of veteran patients. Because the veteran population is growing older -- by the end of the century the number of veterans over the age of 65 will double to nine million -- the VA has made the study of the aging process and diseases that affect the elderly a high priority. The study of blood pressure regulation is but one of the areas under investigation in this overall effort. Progress in the controlling blood pressure and other aging-related disorders will not only improve the quality of life for elderly veterans but will reduce the need for more expensive long term medical and nursing care in the future within the VA health care system.

The Administration's FY 1987 budget includes $164.4 million for the VA MRS program, a 3.2 percent increase over the FY 1986 funding level (adjusted for Gramm-Rudman) of $159.3 million. The President's FY 1987 request is 2.5 percent below the level appropriated for the MRS program by Congress in FY 1986. The following components of the MRS program are of concern to AHA:

- Investigator-Initiated Research: this program supports approximately 1,800 investigators and constitutes 75 percent of the MRS budget. Under the President's budget, this program would receive a 3.5 percent increase.

- Cooperative Studies Program: currently, this program supports 24 clinical trials and it provides a mechanism whereby studies on the effectiveness of diagnostic or therapeutic techniques can achieve statistically significant results by pooling data on patients from a number of VA hospitals. Under the President's budget this program mechanism would receive a 13 percent increase. Key cardiovascular investigations in this program include: a study to determine the efficacy of antiplatelet therapy on graft patency after coronary bypass surgery; a study comparing surgical and medical treatment for asymptomatic carotid stensosis and its importance in the development of stroke; and a study comparing the efficacy of angioplasty and bypass surgery in the treatment of patients with arteriosclerosis in the lower extremities.

- Career Development Awards: this program supports approximately 180 clinician scientists who spend the majority of their efforts on medical research. This program is highly competitive and only 30 - 40 percent of the approved applications can be funded. Under the Administration's budget, career development awards would be increased by 3.6 percent.

Some key additional areas of cardiovascular research in which the VA currently is working include: investigations into the understanding and treatment of hypertension; the study of new and established antiarrhythmic drugs; basic and clinical electrophysiology; the study of alcohol's effect on cardiovascular disorders; the clinical application of new techniques of myocardial scintigraphy; the study of the role of coronary artery bypass surgery in coronary artery disease; and further investigation regarding the understanding and treatment of congestive heart failure.

As is evident, the emphasis of VA cardiovascular research is clinical in nature. The VA supports more clinical researchers and more M.D. principle investigators than the NIH as a whole. Thus, the VA assumes a unique role in the research community because of its ability to translate immediately basic research findings into the VA clinical practice setting.

The VA is less unique in that is suffers many of the same problems that pervade the entire research community: mainly obsolete research equipment and out-dated laboratory and animal care facilities in which to conduct state-of-the-art research. Although funds for these items are not included in the MRS portion of the VA's budget, we urge the Subcommittee to give consideration to appropriating increased funds for renovation, construction and instrumentation for all VA research facilities.

Another unique aspect of the VA MRS program is that it is subject to limits on the number of clinicians it can employ in its VA facilities around the country. Therefore, only a fixed number of individuals can apply for research grants, although the number of applications has grown slightly over the last five years. Insufficient increases in funding only compound this problem. Although 62 percent of VA research applications are approved each year, only half of those approved are actually awarded because of the lack of available funds.

Although the President's budget includes increases for each of the program mechanisms described above, a four percent decrease (-147) in FTEE's has been proposed for the VA MRS program. AHA believes that these proposed reductions in research personnel are short-sighted in light of need the VA's to prepare for future needs of veterans -- by the year 2000, almost two out of every three elderly males will be eligible for VA medical care.

The AHA is keenly aware of the need for fiscal restraint, however, we are concerned about the potential negative long-range effects on the health of the Nation if cutbacks in biomedical research programs are not sufficiently funded in FY 1987. Although the President's budget includes a sight increase for the VA MRS program, we do not believe that it goes far enough. Therefore, we recommend an appropriation of $186.4 million for FY 1987 for the VA Medical Research Service program. An appropriation of this amount will allow for an overall increase of 10.6 percent over the FY 1986 appropriated level for the biomedical research activities of the VA.

The American Heart Association firmly believes that today's investment in biomedical research will lead to great future returns -- further decreases in death rates due to heart disease and stroke; reduced federal outlays for hospital and long-term care expenses; a well-trained cadre of biomedical researchers; and a more healthy and productive society. A 10 percent increase in VA research funds would continue current research momentum in cardiovascular disease within the VA and assist in maintaining the VA's vital role in the overall scientific effort in this field.

We thank you for the opportunity to appear before your Subcommittee and I will be happy to answer any questions you may have.

STATEMENT OF FRANK DE GEORGE, PARALYZED VETERANS OF AMERICA

Senator GARN. Next, Mr. Frank de George.

Mr. DE GEORGE. Senator Garn, it is certainty a pleasure and a privilege and definitely an honor to appear before you here today.

Mr. Jack Pollard, executive director, who was to be with you today, could not be, and wishes for me to extend on his behalf, his appreciation for the efforts by yourself and your committee and your staff in the diligence and the effort that you put forward to address the budget concerning the Veterans Administration.

After your earlier comments, I was prepared to present the oral statement, which I will now lay aside and try to bring some attention to some areas that you expressed concern in what you may or may not know where PVA is coming from.

Senator GARN. We'll certainly put your full statement in the record.

Mr. DE GEORGE. Thank you very much, Senator.

We certainly and definitely do agree with you, as most Americans do, that there is a need to cut the budget deficit. We, too, will make the statement that we do not feel responsible for the present levels of the budget, as high as they may be.

We also would like to point out that the VA's budget has been straight lined over the last and previous 10 years and has not necessarily received the increases desired to provide sufficient necessary care to America's veterans.

With that out of the way, I would like to point out that PVA's recommendations have been provided in the following areas. We suggest that colocation of VA MC's and VA regional offices occur. We feel that this would be a cost-effective measure in reducing the budget, providing sufficient and efficient modalities to serve veterans as well as the VA itself.

We have, as an organization, identified 25 site locations that are within 20 miles of each other, that could possibly be colocated.

A good example of one that is already established is in Milwaukee, WI, where they have colocated the VA regional office and the VA MC, and it works very well. There are others, as I mentioned, 25.

Regarding COLA increases, we stated, as the other veterans organizations did last year, that we, as an organization, appreciate the COLA increases. We feel they're deserved. At the same time, if there were across-the-board freezes or cuts, we would, as long as no other identify received an increase, would accept a freeze in COLA programs.

Senator GARN. I might just comment that I agree with that. If you're going to disallow COLA's, it should be across the board, or everybody should get them, and the Senate and the House were not fair about that last year at all.

Mr. DE GEORGE. I do make a point though, this doesn't help your problem as you requested earlier, how do you expect to correct inefficiencies.

Regarding other areas of inefficiencies or how to create create cost savings. We feel and recommend that the VA must finally come to grips with itself and create criteria for priority listings for VA construction projects. That's not only applying the priorities, but once established, it's a priority list that they themselves could adhere to and live with and understand where they're coming from into the future years.

Regarding the funding of programs and the way the funds are received and with the present status of sequestration, the budget cuts themselves, first we have, on one hand you fund a program and then you take away the money, reduce the staff, and I'm talking specifically about prosthetic medical research where this has occurred. The program was funded and moneys were taken away, 200 and some-odd staff were reduced, then the funds were restored. We find this as a fluctuation in a program and it's hardly no way to run a ship. What it causes is inefficiencies all the way down the line in any program and it's not working efficiently to provide what the purpose of their program is.

Who is to blame? Again, PVA doesn't feel like we're the blame. We don't feel responsible for that happening. Whether or not we want to lay the blame is not the point. The point is that we can't have this constantly occurring and reoccurring with the budget processes as they were and expect the VA to provide, or any agency to provide, needed services in a responsible manner.

So we look at, and ask you to look at, the budget process itself, understanding and knowing how difficult it is for you to address it, when you're looking at a total picture and not have these kind of occurrences happen.

We respect and understand the dilemma this places you in. So, what I am saying is, and there are other programs, whereas PVA has submitted recommendations for cost-effective measures to implement programs, some of these programs have been adopted, some have not, and the ones that we have presented and have been adopted and have shown to be a cost-effective approach toward a budget in reducing the budget for the Vererans Administration, while at the same time improving care and services to veterans, which is paramount, in your estimation, I believe, and certainly in ours.

I would also ask you to look at—and this is one of the areas that we have addressed—work disincentives for non-service-connected veterans to get back into the mainstream.

We had legislation passed last year that addresses this very point. However, in some of that program, subsistence allowances were reduced and causes the non-service-connected veteran the problem of getting through that program.

So, we can't have it both ways. We only implore you to recognize the need for the VA—it is an extension of the Department of Defense—and to recognize that the veterans have served, their dependents have served, and so have they each sacrificed.

I want to thank you again for this hearing today.

Senator GARN. Mr. de George, thank you very much for your forthright statement. I do have a couple of questions for you.

Based upon your concern about the proposed new office of facilities, is it the position of your organization that the Office of Construction should not come under the direction of the Department of Medicine and Surgery?

Mr. DE GEORGE. I don't believe have developed a position relative to that statement, however, I could be corrected and I would like to seek the answer from my superiors back at the office.

Senator GARN. Setting aside the entitlements, if one were setting priorities in the organization, would the first priority, in your view, be the medical care account, and should this be protected above all other VA accounts?

Mr. DE GEORGE. Absolutely; you're talking about the FTEE level?

Senator GARN. Yes.

Mr. DE GEORGE. Yes, sir; we believe and ask you to maintain the already authorized levels of 193,941 FTEE levels for the VA which they, themselves, have not lived up to or adhered to the present law to provide it.

Senator GARN. Thank you very much.

[The statement follows:]

STATEMENT OF FRANK DE GEORGE, ASSOCIATE LEGAL DIRECTOR, PARALYZED VETERANS OF AMERICA

Mr. Chairman and Members of the Subcommittee, I am Frank de George, Associate Legal Director of Paralyzed Veterans of America, and on behalf of the members of Paralyzed Veterans of America, a congressionally chartered veterans' service organization, I want to thank you for affording me the opportunity to appear here today.

PVA appreciates the Subcommittee's efforts to conduct hearings, and for being able to express our views and concerns regarding this most important issue, the proposed Fiscal Year 1987 funding for the Veterans Administration.

All of PVA's members are veterans who have experienced catastrophic spinal cord injury or dysfunction, and it is on behalf of these veterans who have considerable contact with the VA's Regional Offices and Medical Centers located throughout the United States that we present our views today.

Mr. Chairman, the budget proposed for the Veterans Administration for Fiscal Year 1987 is, without a doubt, the most deplorable attack on veterans and the programs and benefits which have been established to meet their needs. In past years we have found shortcomings in proposed VA budgets, but never have we seen such a blatant abdication of the nation's responsibility to the men and women who have rendered service. This budget proposal is more than an effort to curtail federal spending and reduce the deficit, it is an overt effort to eliminate veterans' benefits and preclude veterans' access to needed services, particularly in the the area of medical care.

The proposed budget purports to be a reduction of $408 million below the current year, including $234 million sequestered under the provisions of the "Balanced Budget and Emergency Deficit Control Act of 1985." However, upon examination of the proposals contained within the Fiscal Year 1987 VA budget, it becomes obvious that benefits and services for veterans will be reduced in excess of $1 billion. The budget proposal assumes the Veterans Administration will absorb the effects of inflation, the additional costs associated with cost-of-living increases in compensation, dependency and indemnity compensation (DIC), and pension, and salary increases for employees. All of these factors will drastically diminish the VA's capability to meet the requirements for adequately providing for veterans. Over the past several years we have observed that budgets for the Veterans Administration were basically current services proposals, providing for no real growth in benefits and services. This year's budget proposal falls significantly below any such description and can be viewed only as an effort by this Administration to reduce the scope and availability of services and benefits for veterans. The Fiscal Year 1987 budget proposal for the Veterans Administration falls far short of meeting the current needs of veterans and fails miserably to adequately address future needs.

PVA recognizes the need to reduce the federal deficit, but in examining the proposed Fiscal Year 1987 VA Budget, we find the targeting of veterans' health care and services as a source of spending cuts and deficit reduction to be a reprehensible approach and disservice to the men and women who have served the nation.

Historically, this country has cared for its veterans. This huge task cannot be left to state and local governments which are not equipped for such an effort, and are already overburdened. The cost for providing for our nation's veterans is an obligation that is associated with the continuing cost of our national defense. Continued efforts should be to ensure achievement of the programs of the Veterans Administration, and to accomplish the VA's highest maximum levels of readiness to serve all veterans and maintain the support mechanisms for the Department of Defense, should a sudden military emergency arise.

Mr. Chairman, this year, the nation's 27.8 million veterans, and their 54 million dependents and survivors will have to rely more than ever upon the wisdom and energies of the Committees on Appropriations, the Committees on Veterans' Affairs, and Congress as a whole, to secure adequate funding for the programs and services administered by the VA. Repeatedly, Congress has had to struggle to add funding to proposed VA budgets that were patently insufficient to meet the needs of the nation's veterans, and the task this year will certainly be as challenging as any we have witnessed during the past several years.

The Federal budget that is submitted to Congress each year defines our nation's values and establishes the President's priorities. The nearly $1 trillion budget proposed for Fiscal Year 1987 represents a retreat from our commonly held values, disregards this nation's and Congress' approach for dealing with the deficit and certainly misplaces priorities. If the budget that was submitted to Congress were enacted, as proposed, more than $20 billion in additional reductions would be cut from already curtailed domestic programs that this Administration has continually cut since 1981. At the same time, under the banner of national security, military spending would increase 8 percent, by more than $34 billion in budget authority.

We all share a concern and a commitment to national security, but simply throwing more and more money at the Defense Department is not necessarily going to provide Americans with the defense they expect. The scandalous abuses of military spending that have been uncovered in the past two years clearly demonstrate the inability of the defense community to exercise any efficiencies in effectively administering these increased levels of budgetary authority. Yet, to finance this relentless build up, the American people are asked to accept greater sacrifices and absorb deeper cuts in domestic programs.

The operating budget proposed for Fiscal Year 1987 for the Veterans Administration is just one example of the many programs that have been offered up as sacrificial fodder. As former members of this nation's military service, veterans cannot and will not tolerate the continued reduction in benefits and services which this grateful nation obligated itself to provide us. This obligation was not made under duress. It was not conceived as a great social program, it was provided out of appreciation for the service, the sacrifice and in many cases, for the personal injuries that we, as citizen soldiers incurred in defense of our nation's ideals. Now, under the guise of fiscal constraint, we veterans are supposed to be content with less than that which was promised. Are we to forget our fellow servicemen, those who did not hesitate to give their full measure when asked to fight.

The federal deficit problem is of concern to each and every American, veterans included, but the astronomical deficits that have accumulated over the past five years of the Reagan presidency are not of our doing and we are not willing to allow you or the Administration to forget the obligations and responsibilities incurred by previously enacted legislation benefiting veterans, their families, and their survivors.

The Veterans Benefits and Services function of the federal government, as administered by the Veterans Administration, has increased by approximately 25 percent since 1980, with outlays rising form $21.2 billion to $26.4 billion in the 1987 budget request (House Budget Committee statistics). On the surface this amount may seem adequate, and compared to other nondefense related programs, veterans certainly have not fared as badly as most. Still, one must remember the more than fifty-year mission of the VA, that being "to serve America's veterans and their families with dignity and compassion and to be their principal advocate in ensuring that they receive the care, support and recognition earned in service to this nation."

This they have attempted to do over the years, but recently veterans and certainly you, as members of Congress must be wondering if the role of the VA has not been usurped by a small band of pencil pushing, number crunching, Administration surrogates housed in the Office of Management and Budget, who without concern, save for spending a buck, coldly and dispassionately cut this program and that.

Medical Care

Mr. Chairman and Members of the Subcommittee, the most devastating single component of the Fiscal Year 1987 VA budget proposal is in the area of health care. No VA service provided to veterans is more critical or important to their well-being, and in many cases, their very survival, than health care. The callous proposal in the budget to reduce inpatient episodes of care by 57,354 and outpatient episodes of care by a staggering 1,114,000 is beyond comprehension.

The reductions in the number of inpatient and outpatient episodes is to be achieved by treating fewer "low priority veterans." The budget fails to define or identify who these veterans are and it assumes that the denial of care to these veterans will not be offset by the demand for care currently being denied some 37,000 plus veterans each month. This effort is clearly an attempt to constrict the VA health-care system and allow dollars, not need, to shape the scope and operation of VA medical care.

As it pertains to staffing levels for direct medical care, another area of concern arises, as the VA budget request reflects 1986 estimated medical care employment levels of 193,635 FTEEs. The, "HUD/Independent Agencies Appropriations Act for Fiscal Year 1985," Public Law 98-371 provided the funds for a health care staffing level of 193,941 FTEEs. The VA shamefully, to date, has not adhered to this Congressional mandate and remains in violation as the Fiscal Year 1987 request is for 185,093 FTEEs, which is a decrease of 8,848 FTEEs overall.

We question how many more episodes of inpatient and outpatient treatments could have or, realistically, should have been provided by the VA at a time when the VA has turned away over 37,000 eligible veterans a month. We believe the Congress, while addressing this issue, should insure that the VA staffing levels are not decreased below the authorized level of 193,941 FTEEs.

The VA requested $10.041 billion to provide veterans VA medical care. Despite this request, the Administration and OMB allowed only $9.083 billion for this important veteran benefit, and in so doing failed to provide monies for the thousands of veterans who are being turned away from VA health-care facilities each month. They failed to provide for the expansion of the GRECC's (Geriatric Research Education and Clinical Centers) as mandated by P.L. 99-166, and they have apparently shifted the responsibility for dealing with the aging veteran population onto the states in that medical care provided in non-VA facilities is the only subaggregate of the medical care account that would receive any new monies.

The budget proposal notes that the funding levels requested will provide for the maintenance and operation of all existing VA health-care facilities. While physical structures may remain, services certainly will be diminished. The budget proposal which calls for the loss of over 7,557 FTEE's in medical care, including 1306 nurses and 475 physicians, assumes only a reduction in quantity of services provided. PVA contends that the quality of service will also be reduced with the elimination of such a significant number of FTEEs involved in direct medical care.

Without these medical care personnel the VA is going to be very hard pressed to address the specific and emerging special program areas of: services to aging veterans; female veterans; Vietnam veterans; veterans exposed to Agent Orange and Ionizing Radiation; former Prisoners of War; and of particular concern to us, certain VAMCs may not be able to provide the highly specialized care and rehabilitative service to those veterans who are paralyzed due to spinal cord injury or dysfunction. We have testified on numerous occasions that the VA system of 20 medical centers that specialize in spinal cord injury are unparalleled in this nation for their combined expertise and concern. It is incumbent to maintain the VA medical care account at a funding level that most adequately serves the needs of all veterans, both now and in the future.

In regard to the number of veterans eligible for VA health-care services, the VA estimates that under existing legislation, 11,984,000 veterans could, if they so desired, qualify for care. Of this population pool, only about three million veterans availed themselves of VA medical care in 1984. Last year the Administration proposed legislation to implement a "means test" for health care eligibility. That proposal was very inequitable, but a more realistic "means test," disconcerting as the concept is, was finally ironed out and agreed to by the Committees on Veterans' Affairs, only to be stalled in Congress, but finally agreed to the "Consolidated Omnibus Budget Reconciliation Act of 1985," Public Law 99-272, recently signed by the President.

Mr. Chairman, an adopted version of a "means test" was enacted in lieu of the Administration's test. Our concern for implementation of an equitable "means test" stems from the VA's Fiscal Year 1987 projected budget savings of more than $350 million and 6,988 FTEEs that purportedly will be realized by treating fewer "low priority veterans." We not only challenge the legitimacy of this cost savings, we fail to believe that the integrity of the VA health-care system can be maintained with such cuts in personnel and changes in patient mix.

In addition, we challenge the VA's or OMB's assumption that another 1,939 FTEEs and $57,200,000 can be realized through increased productivity in the medical care account during Fiscal Year 1987. We do not mean to imply there are not operations which cannot be improved or FTEEs who cannot be more effectively utilized, far from it, but it is high time that this Administration realize what an efficient health-care delivery system it has operating within the Veterans Administration. According to the figures contained within the House Budget Committee's analysis of the 1987 budget, VA hospital and medical care costs have only risen approximately 50 percent, while demand has increased since 1980. This indicates a cost-effective system compared to the private sector where the cost of a hospital room alone has increased by 63.2 percent and doctor fees have increased 46.3 percent over the same time frame, according to figures recently released by the Bureau of Labor Statistics.

Medical and Prosthetic Research

Another area of the VA budget with which we are very much concerned lies in the area of medical and prosthetic research. The $226,634,000 that was expended in Fiscal Year 1985 for this vital investment in the future care and rehabilitation of severely disabled veterans represents less than 1/10th of one percent of the total VA budget; yet, this account took a nearly 18 percent or a $40 million cut in Fiscal Year 1986 budget considerations. Now, seven months into Fiscal Year 1986, the President proposes to restore the $7,885,000 lost to sequestration back into this account in the coming year, but the research will be performed by 285 fewer FTEEs than were available last October. We view this unstable fluctuation of both funding and staffing as a devastating approach to maintaining the integrity of the VA's highly sophisticated, highly client-oriented research programs.

As has been the case in prior years, when monetary funds become scarce, research activities, especially those that do not hold promise of an immediate return on investment, are curtailed or in some cases terminated. We are very concerned that the VA's research efforts into central nervous system disorders such as spinal cord injury, dysfunction, and regeneration will be seriously disrupted. Such vacillation of commitment toward the one ray of hope and cure for the insidious ramifications of the many, as yet, unexplained medical phenomenons, we view as being penny-wise and pound-foolish. The VA's list of "Who's Who" in medical and prosthetic research is extensive as well as impressive, and the benefits that are and can be realized by their combined expertise should not be taken lightly. We request that additional monies be channeled into this important portion of the VA's Fiscal Year 1987 budget, especially as it pertains to the VA's targeted high priority research which includes spinal cord injury and nerve regeneration.

Personnel

Another aspect of the proposed Fiscal Year 1987 budget that is of concern to PVA lies in the VA Central Office's approach to maintaining critical manpower needs. We must question the rationale for all the reorganization proposals that have been submitted. We feel, this year, more so than in years past that the Veterans Administration has given up in their fight to advocate for the real needs of veterans and has instead decided that its new mission should be to maintain itself, meaning those bureaucratic functions that best serve that Administration, rather those that best serve the veteran population. This is harsh criticism to levy at the one agency within the federal government that is charged with the mandate of providing for veterans. Maybe after all the continuous assaults by this Administration to pare down the size of the federal government and shift more functions and responsibility to the state and local segments of our society, the VACO has assumed a "bunker mentality" and is now engaged in a new mission of protecting its own employees at the cost of providing veteran services.

A prime example of this reprogramming of missions lies in its formation of the new Office of Facilities. When the budget proposes such drastic cuts in overall VA construction, it is difficult to understand why 733 FTEEs are needed to supervise a reduced function, whereas, without hard data to support the reduced need for hospital medical personnel, namely 1,306 nurses and 475 doctors, they choose to let these people go. We have been informed that a portion of the nearly 7,557 FTEEs scheduled for termination in the medical care account are to be absorbed into this new Office of Facilities. This is good for those affected employees, but how will this reprogramming aid in service to veterans?

Another example of VACO entrenchment was their handling of the "sequestration order" that was recently issued by the President. In this situation the VA opted to reduce the amount of monies available for specially adapted housing, auto grants and adaptive equipment, all direct benefits to catastrophically service-connected disabled veterans, rather than lay off personnel within that line-item function that could result in a comparable cost saving. Again, the question must be asked -- has the VA given up its role as chief advocate for veterans and is it now more concerned in trying to maintain the status quo among its own bureaucratic rank and file?

Another directive that has surfaced, not contained within the actual Fiscal Year 1987 VA budget per se, but contained in OMB documents relating to the VA's 1987 passback, was the mention made of restricting VA health care to nonservice-connected veterans to a maximum of 500,000 episodes in Fiscal Year 1987. The OMB directive to the VA indicated that it would approve funding for 1,243,700 inpatient episodes of veteran care, and limit nonservice-connected veterans to 500,000 episodes. PVA finds this directive not only unrealistic, but totally immoral, unprincipled and possibly in violation of congressional intent. The concept of establishing health-care usage ceilings might be an acceptable planning practice in the sterile, compassionless setting of the OMB office; but, when the VA's own data reveal demographic and patient profiles that support a totally different patient mix, then we are left to assume that OMB is in an outright assault on the VA's ability to perform its mission.

VA Construction

PVA believes the VA's Fiscal Year 1987 proposed construction budget of $408 million in new budget authority, a reduction of over $208 million from 1986, clearly demonstrates that the Administration fails to recognize (or chooses to ignore) the importance of maintaining and building adequate facilities if the VA is to perform its assigned function.

It is a very serious matter that so many VA facilities are now in a state of decay, only marginally meeting the needs of the veterans who use them. In previous years, testimonies given by veterans' service organizations and the Department of Medicine and Surgery indicated that over half of all the beds located in VA facilities are in buildings 35 years old or older. Decaying facilities not only diminish efficient patient usage, they also hamper the recruitment and retention of qualified doctors and nurses.

Equally disturbing, or puzzling, is that while the VA's Office of Construction budget, as proposed for 1987, will be reduced by 34 percent from the previous year, with certain of its duties being taken over by another department, the Office of Construction employment level and administrative costs do not experience similar reductions.

A newly constituted associate deputy administrator for management will now perform construction's independent facilities management and will be provided funding for an increase of FTEEs. In addition to all of this, an Office of Facilities, another brand new office created under reorganization, is requesting a funding level of $38.9 million for 1987. It is hard to understand the Administration's or VA's rationale for the significant increase in FTEEs within construction and facilities management, when obviously there is a proposed decrease in program activity.

The impending demands of the aging veteran population had been a responsibility which the Veterans Administration was taking seriously. Now the VA has apparently decided to shift its mission, restructure its long-term care policy, and rely on the states and their communities to furnish the necessary facilities for providing care. This shift is evidenced by the Fiscal Year 1987 budget proposals. The grant funding level for construction of state extended care facilities provides an increase of over 100 percent from the current year, whereas the funding for the construction of VA nursing homes has been reduced by 82 percent.

The proposed funding level for the VA to assist the states in the acquisition or construction of state nursing homes for the remodel, modification, or alteration of existing state veterans' homes is to increase to $42.4 million in 1987, up over $21.6 million from the previous year level of $20.8 million. This large increase in funding is somewhat unrealistic when keeping in mind the necessary planning and restrictions that states must adhere to, not to mention the necessary funding they must secure, before such a facility can be obtained, modified, or constructed. It is apparent that more and more of the solutions to problems are being shifted to the states from the federal government. This is just one more situation evident today where the federal government is relying on the states, which are already overtaxed and overburdened, to assist in solving a critical shortage in providing for our nation's aging veterans. A task, I might add, that is not rightfully theirs.

Veterans' Benefits

Mr. Chairman, the area of readjustment benefits is another issue of concern to PVA as proposed in the Fiscal Year 1987 VA budget. The Administration proposes to eliminate or significantly curtail numerous programs and services for veterans regardless of their obvious benefit and need. The new G.I. bill has already proven itself as a viable educational asset for veterans. The exceptionally high participation rate has significantly been of value to the military and, more importantly, will have long lasting benefits for individual veterans and the nation as a whole.

The failure to provide funding for the "Emergency Veterans' Job Training Act of 1983" is equally disconcerting. While unemployment may have decreased for certain segments of society, for those veterans without jobs, the need for this program still exists. There remain thousands of unemployed, eligible veterans who have been certified for training under this program, but who have not entered actual training. To eliminate funding for this program just when the economy's recovery offers these veterans their greatest opportunity seems to be inappropriate and counterproductive.

Another issue of concern contained within the proposed 1987 budget is the Administration's attempt to dismantle the VA's Home Loan Guaranty Program. Again, legislation is being proposed this year to raise the current "users fee" from 1 to 2 percent, eventually raising it to 3.8 percent by 1990.

The VA's Home Loan Guaranty Program is an entitlement program, with every veteran meeting the requirements being eligible for a guaranty of their mortgage up to 60 percent of the loan or $27,500, whichever is less.

PVA believes that any increase in the "user's fee", if enacted, would have a detrimental effect on the ability of veterans to obtain guaranteed loans, and thereby discouraging veterans from home ownership. By raising the origination fee, veterans using their guaranty entitlement would either have to pay the increased fee up front, or have the fee added on to the loan.

This would result in a veteran needing a substantial amount of cash on hand, or having to add the users fee into the loan, thereby increasing the amount of the mortgage and inflating the property's actual value.

Having already assisted over 11 million veterans in obtaining suitable, affordable housing, the VA Home Loan Guaranty Program has been, without a doubt, one of the more successful undertakings in this nation's history. This program has been a good investment in America, providing stability and expanding the tax base of nearly every community in our country.

Mr. Chairman, the Fiscal Year 1987 budget proposal does provide for a cost-of-living increase in compensation, dependency and indemnity compensation and pension. This is one positive aspect of an otherwise bleak budget proposal. These cost-of-living increases will ensure that veterans and their survivors will not see their quality of life eroded by the effects of inflation. However, these proposed increases are achieved through the reduction of other benefits and services provided by the Veterans Administration.

Finally, PVA would be remiss if we did not address the VA's recent approach to achieving savings mandated through sequestration. Effective March 1, 1986, there will be drastic reductions in readjustment benefits paid to those veterans who are the more severely disabled, service-connected veterans. Vocational rehabilitation subsistence allowance, paid to those service-connected veterans who are in training, will be cut by 13 percent. The grant for specially adapted housing, payable only to those veterans who are permanently and totally disabled will be reduced by $2840. The grant to a service-connected veteran for the purchase of an automobile or other conveyance and/or to adapt one with necessary special equipment is cut $400.

This approach is abhorrent and reflects an insensitivity to and callous disregard for the service rendered by these eligible veterans. The VA demonstrated a willingness to reduce benefits for the most seriously disabled service-connected veterans rather than explore other methods for achieving the same savings.

As you are aware, both the Senate and House Committees on Veterans' Affairs have completed hearings on the VA budget and also received annual testimonies from the various National Veterans' Service Organizations, including PVA. Subsequent to these hearings the Committees on Veterans' Affairs have reported their budget recommendations.

Chairman G. V. "Sonny" Montgomery reported the budget recommendations of the House Committee on Veterans' Affairs on February 27, 1986. Chairman Montgomery stated during markup hearings, "I personally feel the cost of veterans' benefits and services is part of the cost of our national defense. What we do for people who are called on to fight in our nation's conflicts is more important than any weapons system ever devised, and this Committee has always attempted to make certain that monetary benefits for the disabled and needy veterans and health care are always there when needed. We must not back away from that commitment." (emphasis added).

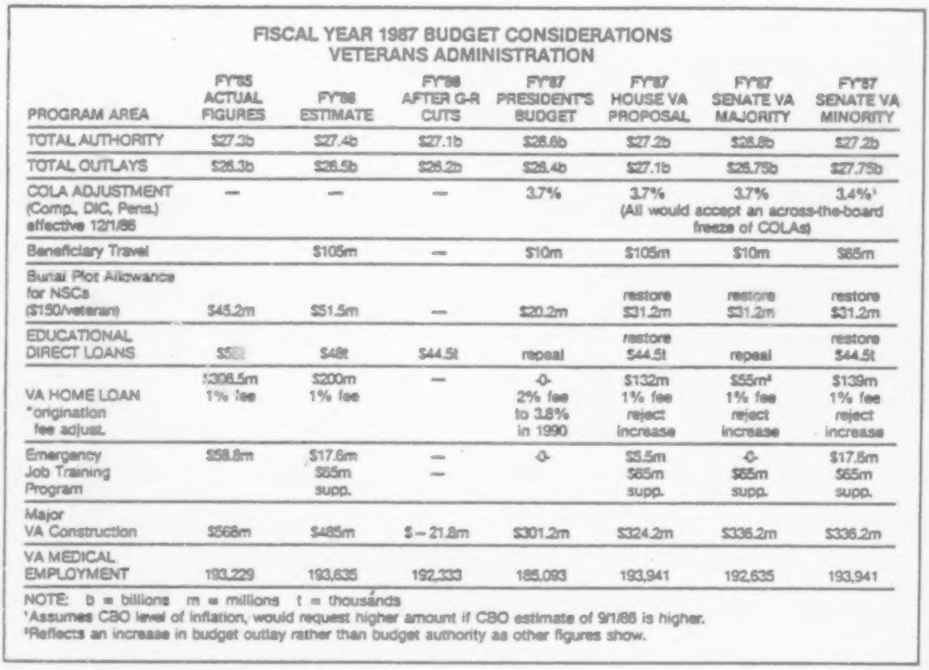
The various budget recommendations are highlighted in the accompanying comparison chart (See attachment). The Fiscal Year 1987 Budget is pending in the Budget Committees. PVA is mainly supportive of the Senate and House Committees on Veterans' Affairs proposals, especially where they provide for VA medical care employment levels of 193,941 FTEEs.

In submission of our Annual Testimony, PVA has provided recommendations that we believe are cost effective and will serve to reduce the federal budget for some VA programs to the Senate and House Committees on Veterans' Affairs for their examination and hopeful implementation. These recommendations are too lengthy for presentation here today, but are available.

We appreciate the fact that this Subcommittee has and will provide careful examination of the proposed funding for the VA and the needed scrutiny of the VA's programs to provide the necessary appropriations. Further, we trust and also believe that your commitment to veterans equals the intent of Congress.

The recent sequestration of veterans' benefits and the Fiscal Year 1987 budget proposal seriously call into question the esteem and regard which this Administration affords the Nation's veterans and their past service. Hopefully, this Subcommittee and the Congress will, as they have in the past, continue to honor and uphold the Nation's obligation - its commitment to the veteran.

Mr. Chairman, that concludes my statement. Thank you and the Members of the Subcommittee for your thoughtful consideration of this issue, and I will answer any questions that I can.



FISCAL YEAR 1987 BUDGET CONSIDERATIONS
VETERANS ADMINISTRATION

PROGRAM AREA	FY'85 ACTUAL FIGURES	FY'86 ESTIMATE	FY'86 AFTER G-R CUTS	FY'87 PRESIDENT'S BUDGET	FY'87 HOUSE VA PROPOSAL	FY'87 SENATE VA MAJORITY	FY'87 SENATE VA MINORITY
TOTAL AUTHORITY	$27.3b	$27.4b	$27.1b	$28.6b	$27.2b	$28.8b	$27.2b
TOTAL OUTLAYS	$26.3b	$26.5b	$26.2b	$26.4b	$27.1b	$26.75b	$27.75b
COLA ADJUSTMENT (Comp., DIC, Pens.) effective 12/1/86	—	—	—	3.7%	3.7%	3.7%	3.4%[1]
					(All would accept an across-the-board freeze of COLAs)		
Beneficiary Travel		$105m	—	$10m	$105m	$10m	$65m
Burial Plot Allowance for NSCs ($150/veteran)	$45.2m	$51.5m	—	$20.2m	restore $31.2m	restore $31.2m	restore $31.2m
EDUCATIONAL DIRECT LOANS	$5[illegible]	$48t	$44.5t	repeal	restore $44.5t	repeal	restore $44.5t
VA HOME LOAN *origination fee adjust.	$308.5m 1% fee	$200m 1% fee	—	-0- 2% fee to 3.8% in 1990	$132m 1% fee reject increase	$55m[2] 1% fee reject increase	$139m 1% fee reject increase
Emergency Job Training Program	$58.8m	$17.6m $65m supp.	— —	-0-	$5.5m $65m supp.	-0- $65m supp.	$17.6m $65m supp.
Major VA Construction	$568m	$485m	$ – 21.8m	$301.2m	$324.2m	$336.2m	$336.2m
VA MEDICAL EMPLOYMENT	193,229	193,635	192,333	185,093	193,941	192,635	193,941

NOTE: b = billions m = millions t = thousands

[1] Assumes CBO level of inflation, would request higher amount if CBO estimate of 9/1/86 is higher.

[2] Reflects an increase in budget outlay rather than budget authority as other figures show.

STATEMENT OF STEPHEN L. EDMISTON, DEPUTY NATIONAL LEGISLATIVE DIRECTOR, DISABLED AMERICAN VETERANS

Senator GARN. Our next witness will be Stephen Edmiston from the Disabled American Veterans here?

Would you please proceed?

Mr. EDMISTON. On behalf of the more than 1 million members of the DAV, I want to thank the subcommittee for allowing us to appear here today to discuss the VA's fiscal year 1987 budget.

As I have noted in my written statement to the subcommittee, the DAV is seriously concerned that due to past negative funding levels of the VA health care system, continued quality medical care at each and every VA medical facility has been grossly jeopardized.

This morning, I can tell you that the lack of quality medical care, in fact, the lack of availability of medical care from the VA, for even service-connected disabled veterans, is becoming more and more commonplace throughout the VA health care system.

Furthermore, we have been informed that in some VA medical centers, so-called over-the-counter or nonprescription items and medications, will no longer be provided to veterans. Maybe to some, that may not seem unreasonable, but what of the World War II veteran who suffers from periodic episodes of osteomelitis of his leg due to gunshot wounds suffered in combat. That veteran is now told that he has to attain the salve and the dressings he requires to treat the service disability on his own from a private pharmacy?

Such actions by the VA to reduce costs could very well lead to such things as telling veterans who receive life-saving insulin from VA pharmacies that they must purchase their own syringes from outside sources and, unfortunately, the story does not stop there.

Recently the DAV wanted to know how long veterans were on waiting lists for nursing home care. We learned that veterans were on such lists for as long as 1 to 3 years and, in some cases, even longer.

However, as we discovered that in some areas, nursing home care waiting lists miraculously went from 35 names to no names at all over night. In some areas, other areas of the country, waiting lists were very short because the VA was discouraging patients from applying.

Contrary to the fundamental principal that service-connected disabled veterans receive priority care from the VA, they're being turned away without care in growing numbers. In many more instances, they are being forced to run a humiliating gauntlet of intimidation, indifference, and outright abuse before they finally receive that care.

As an example, we learned of a veteran who was totally disabled due to a heart problem. He suffered a heart attack and was rushed to a hospital nearby, which happened to be a military hospital. When his condition stabilized, the VA was contacted to arrange a transfer, but they informed the military hospital that no beds were available. Because the veteran required some sophisticated cardiac care the military could not provide, they transferred him to a local county medical facility. Subsequently, they also contacted the VA seeking to transfer the veteran to the VA hospital. Again the VA said they had no available beds. Unfortunately, this veteran died without receiving any VA care.

But that really isn't the worst part of the story. The fact is that the veteran's survivors are now wondering if and when the VA will finally pay those private medical bills.

I don't want anyone to misunderstand our intent. The vast majority of VA employees are dedicated professionals. The vast majority of eligible service-connected disabled veterans, seeking care, receive that care and they receive it from cheerful, competent, and helpful VA employees.

But too many tales of VA patient frustration and fear are coming out of the VA these days. Too many services in too many VA hospitals are understaffed and overworked and, as a result, too many short cuts are being taken and too many chances for error are cropping up.

The VA, which has operated for years on the premise that they could do with less, is now in the process of losing the battle. The juggling act to provide quality health care, even as funds have diminished, has come crashing down around the systems shoulders.

And, with that, Mr. Chairman, I would like to conclude and strongly urge the subcommittee to favorably recommend to the HUD appropriations bill realistic and adequate levels of funding that addresses the needs of all the VA programs, but particularly the health care programs.

And, again, I want to thank you for this opportunity to appear before the subcommittee.

Senator LAUTENBERG. Thank you, Mr. Admiston, for your testimony. Your statement will be in the record and it will be reviewed with your comments on the record.

I know that your group has followed some of the funds we have earmarked in the past with medical and prosthetic research for the development of voice-actuated robotic devices for disabled veterans. Can you bring us up to date as to when some of this research may be paying off for the disabled veteran who needs that kind of assistance?

Mr. EDMISTON. A member of our staff who follows that very closely has informed me that great strides have been made in past years in that research. Just exactly when we may see the veterans fully benefiting from that research, I really couldn't give you anything precise on that. We're hopeful that will be in the very near future though.

Senator LAUTENBERG. Of course we like to see progress, even though sometimes it takes a fair amount of time for these things to develop. We appreciate your testifying today and with that we'll be calling our next witness.

[The statement follows:]

STATEMENT OF STEPHEN L. EDMISTON, DEPUTY NATIONAL LEGISLATIVE DIRECTOR, DISABLED AMERICAN VETERANS

On behalf of the more than one million members of the Disabled American Veterans and its Ladies Auxiliary, I am pleased to have this opportunity to discuss the budget request for the Veterans Administration for Fiscal Year 1987.

Let me begin by thanking you, Mr. Chairman, and the members of the Subcommittee for permitting us to present our views on the Fiscal Year 1987 VA budget request prior to completing your work on the Fiscal Year 1987 HUD and Independent Agencies Appropriations measure.

Before specifically addressing the VA's proposed Fiscal Year 1987 budget request, Mr. Chairman, we believe that it is important to point out that the obvious driving force that has shaped this budget is the Gramm/Rudman/Hollings balanced budget amendment. Not only has Gramm/Rudman/Hollings influenced the make up of the Fiscal Year 1987 budget request, it has also inflicted direct benefit reductions on deserving service-connected disabled veterans, their dependents and survivors in the current Fiscal Year.

Therefore, as the Subcommittee considers the VA's Fiscal Year 1987 Budget Proposal, we urge you to fully consider taking appropriate actions to insure that VA programs and benefits that impact directly upon service-connected disabled veterans and their families are protected from the provisions of Gramm/Rudman/Hollings.

As you know, Mr. Chairman, on behalf of the Veterans Administration, the President is requesting $26.6 billion in budget authority to administer the various programs and services for millions of our nation's veterans and their families in Fiscal Year 1987.

In budget authority, the VA request is approximately $408 million below the Fiscal Year 1986 level, primarily due to so called "projected savings" that include:

* staffing reductions of more than 8,900 health care professionals;
* a substantial decrease in the number of veterans treated as inpatients and outpatients;
* substantial reduction in construction funds;
* an incremental increase from 1% to 3.8% in the user fee charged to VA guaranteed home loans;
* seeking no funding for the Veterans Job Training Program;
* repealing the VA's authority to grant education loans;
* closing the all volunteer force GI Bill to new enrollees;
* a change in eligibility criteria for the VA plot allowance.

Overall, Mr. Chairman, these projected savings, coupled with other budget proposals and the Gramm/Rudman/Hollings sequestering order that became effective March 1, 1986, clearly jeopardize the VA's ability to provide continued quality care at every medical facility in the VA health care system.

Medical Care

The Fiscal Year 1987 budget request calls for an overall decrease in funding in the VA's medical care account of $46.1 million below the Fiscal Year 1986 level.

At first glance, Mr. Chairman, it would appear that the funding reduction for VA medical care is quite small, however, when looking beneath the surface and examining the budget documents for the VA's medical care funding proposal, one can discern an entirely different picture.

For example, the VA proposes to:

- treat fewer "low priority" veterans;
- reduce medical care personnel by 1%; and
- nearly eliminate beneficiary travel.

By so doing, VA claims it can reduce the number of medical care personnel by more than 8,900 and save over $500 million.

The loss of more than 8,900 medical care personnel translates into the loss of more than 1,300 nurses and 500 doctors and dentists, as well as other health care personnel involved in direct patient care.

As a result, the VA will treat fewer (so called) "low priority" veterans by 62,000 inpatient and 1.2 million outpatient visits, and further reduce the overall number of VA hospital and nursing home operating beds by approximately 3,000 from the Fiscal Year 1986 budget level.

Mr. Chairman, the President's proposed Fiscal Year 1987 VA budget request blatantly ignores the provisions of Section 5010(a)(1), Title 38, USC -- "The President shall include in the budget transmitted to the Congress for each fiscal year pursuant to section 1105 of title 31, an amount for medical care and amounts for construction sufficient to enable the Veterans' Administration to operate and maintain a total of not less than 90,000 hospital and nursing home beds in accordance with this paragraph ..." (emphasis added)

The budget documents reveal that during Fiscal Year 1986 the VA will operate at least 900 beds below the statutory requirements and will seek to further circumvent the law by operating 4,000 fewer beds than the law requires in Fiscal Year 1987 ... while at the same time proposing to cancel all new VA nursing home construction.

We must question, Mr. Chairman, why the VA (or OMB) is seeking such drastic reductions in VA medical care funding when their own statistics reveal they are turning away more than 30,000 eligible veterans who are seeking VA health care services each month.

In the past OMB has made it perfectly clear that it would like "to shrink the size of the system" -- but is this OMB's real effort or does it want to simply destroy the VA health care system?

As you know, Mr. Chairman, the VA health care system has been on a serious decline for a number of years due to negative (deflated) funding. The proposed Fiscal Year 1987 medical care budget request only exacerbates this chronic state that has existed for more than a decade.

Reduced medical care funding, coupled with such proposals as drastic reductions in health care personnel, decreasing the number of veterans treated, elimination of most beneficiary travel funds, reducing the number of available beds and providing no new funding for the Health Professional Scholarship Program, only serve to jeopardize the quality of health care provided at each and every VA medical facility.

We note, Mr. Chairman, that the VA is again proposing legislation to (1) repeal section 610(a), Title 38, USC -- providing eligibility for hospital or nursing home care for a nonservice-connected disability if the veteran is 65 years of age or older -- (2) establishing a means test for certain categories of veterans without service-connected disabilities and (3) provide authority for the VA to collect reimbursements from private health insurers of nonservice-connected veterans receiving VA health care services.

These legislative proposals, as you know, Mr. Chairman, were addressed by the House and Senate Veterans' Affairs Committees and are currently part of the Consolidated Omnibus Budget Reconciliation Act of 1985 (H.R. 3128) -- now Public Law 99-272.

For the record, Mr. Chairman, the DAV does support the medical care eligibility changes in Public Law 99-272. These provisions, in our view, are a significant step to strengthen and enhance health care for all service-connected disabled veterans.

With respect to the proposal to authorize the VA to collect reimbursements from private health insurers -- as proposed by the VA and contained in Public Law 99-272 -- the DAV remains unconvinced the VA will in fact receive revenue in excess of the administrative costs of implementing and collecting these payments.

Mr. Chairman, we encourage you, and the members of the Subcommittee, to carefully scrutinize the Fiscal Year 1987 funding levels proposed for the VA medical care program. We believe such scrutiny will lead you to recommend realistic levels of funding (unlike that proposed by the President) that will acknowledge the importance of providing timely, quality medical care services to our nation's eligible veterans. Such levels of funding, as you know, have been proposed for VA medical care by the Senate Budget Committee in the Fiscal Year 1987 Concurrent Resolution on the Budget -- S. Con. Res. 120 -- which we encourage this Subcommittee to emulate.

Construction

The VA's Fiscal Year 1987 construction request is $465 million, some $332 million below the $797 million Fiscal Year 1986 level.

Mr. Chairman, while we support full funding of the VA's request for construction programs we are, quite frankly, seriously concerned that this type of construction request fails to adequately address the needs of the aging capital plant of the VA health care system.

Furthermore, while more and more elderly veterans are seeking nursing home care from the VA, this construction request reflects a new OMB mandated policy which directs the VA to shift the responsibility for VA nursing home care to state and community nursing facilities. As a result all new VA nursing home projects have been proposed to be cancelled.

The VA's Fiscal Year 1987 budget request does contain, however, a $21.5 million increase (over the Fiscal Year 1986 level) in grants for construction of state extended care facilities. The VA's request of $42.4 million will provide for an additional 120 nursing home care beds, 126 convertible domiciliary/nursing home beds and 150 domiciliary beds.

As you know, Mr. Chairman, this particular federal/state sharing program has been a tremendous success in terms of encouraging states to actively participate in the nation's commitment to providing quality care to her eligible veterans. However, the DAV does not believe the federal government should relinquish its primary responsibility for veterans health care -- especially in the nursing home care area.

Additionally, we have noted that the VA continues to reduce the number of medical, surgical and psychiatric beds, while at the same time providing modest increases in the number of intermediate and nursing home care beds, to include conversion of some existing hospital beds to nursing home care beds.

While the DAV does not object to some realignment of operating beds we trust an appropriate balance will be maintained to meet the acute, intermediate and long term health care needs of all eligible veterans.

Mr. Chairman, the VA construction request for Fiscal Year 1987 simply does not go far enough to allow the VA to accomplish what must be done if the health care system capital plant -- which represents a multi-billion dollar investment on the part of the American taxpayer -- is to remain viable.

Proposed Legislation

The Administration's Fiscal Year 1987 budget request proposes legislation, in addition to that which I have previously discussed, that would (1) provide an increase of 3.7% in the rates of Disability Compensation and Dependency and Indemnity Compensation (DIC) effective December 1, 1986; (2) increase the loan origination fee incrementally from 1% to 3.8% by 1990; (3) change eligibility for the plot allowance so that it would be the same as the burial allowance; (4) repeal the VA's authority to make education loans; and (5) close the All Volunteer Force GI Bill to new enrollees and reopen the Post Vietnam Era Education Program.

The DAV is pleased with the Administration's proposed cost of living adjustment in the rates of Disability Compensation and DIC benefits -- in recognition of the special consideration service-connected disabled veterans and their survivors should be given.

Accordingly, Mr. Chairman, the DAV supports the enactment of legislation that would provide disability compensation and DIC recipients with a cost of living adjustment in line with the rise in the Consumer Price Index effective December 1, 1986.

As noted, the Administration has again proposed increasing the home loan guarantee program users' fee incrementally from 1% to 3.8% by 1990.

We believe the Subcommittee should carefully evaluate the adverse impact this proposal would have on Vietnam veterans, who are the primary beneficiaries of the program today and, should it be rejected, we respectfully request that the Department of Veterans Benefits be exempted from absorbing the funds associated with the proposed legislation.

As you know, Mr. Chairman, the Fiscal Year 1987 Senate Budget Committee reconciliation recommendations for the VA does not include savings associated with the legislative changes recommended by the Administration to (1) change eligibility for the VA plot allowance, (2) cease education loans and (3) close the new GI Bill education program.

We urge the Subcommittee to also reject these proposals.

Conclusion

In closing, Mr. Chairman, in addition to the views we have already set forth with respect to the VA's proposed Fiscal Year 1987 budget request, I want to further emphasize and underscore our very serious concern for the VA health care system and the devastating effect the Administrations' budget (if approved as proposed) spells for those eligible veterans who rely on the system for medical care.

We urge the Subcommittee to favorably recommend to your colleagues in the U. S. Senate levels of funding in the Fiscal Year 1987 HUD and Independent Agencies Appropriations bill that realistically and adequately address the needs of all programs administered by the VA.

Again, Mr. Chairman, I wish to thank you and the members of the Subcommittee for providing us this opportunity to express our views on this most important subject.

FEDERAL HOUSING CREDIT PROGRAMS

STATEMENT OF WARREN LASKO, EXECUTIVE VICE PRESIDENT, MORTGAGE BANKERS ASSOCIATION OF AMERICA.

ACCOMPANIED BY BURTON WOOD, LEGISLATIVE COUNSEL STAFF, MORTGAGE BANKERS ASSOCIATION OF AMERICA

Senator LAUTENBERG. Mr. Warren Lasko of the Mortgage Bankers Association.

Mr. LASKO. My name is Warren Lasko. I am executive vice president of the Mortgage Bankers Association.

Senator LAUTENBERG. Welcome and we await your testimony.

Mr. LASKO. We're delighted to have this opportunity to testify.

I really just want to talk about one thing this morning and that's to address the credit limits—the credit limits on the Federal housing credit programs, more specifically the FHA, VA, and GNMA credit programs.

Each are experiencing difficulties right now in terms credit availability and I would like to take advantage of the time available to address those difficulties.

First, by way of a little background of what is going on in the housing markets right now. These are exciting times for prospective homeowners. The current state of the market——

Senator LAUTENBERG. More for the sellers than for the buyers?

Mr. LASKO. Both. One useful way, I think, to think about what's going on, is that we're turning back history, we're turning back the clock about 8 years and we're rolling back interest rates to just about everybody's advantage. In rewinding interest rates to where they were more than 8 years ago, we're giving just enormous numbers of people a chance to refinance mortgages they already have and to give families a chance who haven't bought a house to buy one for the first time.

Families are absolutely stampeding their lenders to refinance high rate loans made over the last 8 years and refinancing accounts for about one-half of all the loans currently being made in the home mortgage market.

A key point I want to make is that this is a healthy phenomenon. Refinancing benefits all of us in essentially four ways. For the homebuyer, the homeowner who gets the refinanced loan, there's an opportunity to save hundreds of dollars. We frequently hear an example of saving $200 a month. That's an additional spendable income. It's a chance to avoid pressing the limits of your budget each month. For lenders, we represent mortgage bankers, we welcome it because it's a chance to reduce the chances of delinquencies and foreclosures and losses to the lending community. We think it's an advantage to the Government to see this refinancing taking place because FHA, in particular, as they see rates come down, are going to have lower delinquency rates and lower loss rates. We think it is a benefit to the national economy because of higher discretionary income on the part of homeowners; it's going to spur the economy a bit.

An equally important point when we're talking about credit ceilings, is that these refinancings absolutely do not add to the amount of federally guaranteed debt outstanding. Statutory ceilings apply to the gross amount of guarantees made, but when it's being used to refinance outstanding debt, you're really not extending the contingent liability of the Government by a bit.

All this good news in the housing market has its downside. As a result of all this activity, the agencies are simply reaching their limits. VA, as you know, reached its limit about a month ago and the Congress reacted very firmly and quickly to increase the VA guarantee limit, so they're back in business. GNMA closed its doors 3 or 4 weeks ago and GNMA has simply been out of the market. FHA is probably going to announce today, perhaps tomorrow, that they're out of business. The FHA, by the numbers, will reach its limit today, probably, and that has an astounding impact.

FHA will suddenly stop taking 10,000 applications a day from families trying to buy a home or refinance. It's a staggering number. At the same time they will be unable to process 50,000 applications they have in their pipeline, as yet unprocessed. FHA starting today, we think, will take no new applications, assign no new case numbers, and assign no new appraisals. The backlog is going to pile up 10,000 cases a day.

Credit ceilings, if I can be philosophical for a moment, poses a dilemma. On the one hand they are intended to be an understandable constraint on the amount of credit involvement the Government has in the economy.

But, on the other hand, they are superimposed on essentially demand driven programs. The result is that the credit ceilings simply don't work, and if there ever was any doubt that they don't work, it's the experience of the last few weeks that proves it. Here we are in the strongest housing market in over a decade and the Government programs have been shut down already three separate times.

There is a paradox in having the ceilings kicking in just when they shouldn't. In this period of large Federal deficits and budget constraints, housing programs are bringing in money, actually bringing in large amounts of money to the Federal Treasury. Further, as I noted, housing is one clear bright spot on the economic horizon, and yet the Federal credit limits on FHA, VA, and GNMA could well throttle what promises to be an engine of economic expansion and deprive the Treasury of earnings and, most importantly, prevent FHA and VA homeowners from saving hundreds of dollars a month in monthly payments.

Who benefits from this? Usually when something bad is happening, somebody is going to benefit. The irony is that the people benefitting, the institutions benefitting, are the investors in the outstanding mortgages. Large institutions holding GNMA securities backed by high rate mortgages get to hold those 12-, 13-, 14-percent mortgages all the longer to the extent that homeowners can't refinance.

Imagine, if you will, the confusion, the quandary of a young family, buying its first house, applying for an FHA or VA mortgage and being told in their loan commitment, this is happening, understandably, being told in their commitment that getting their house, getting their loan is conditional upon Congress approving increases to GNMA's credit ceiling. They just have to be confused and there's no question that we have disruption out there right now.

As a result—and needless to say we strongly support ceilings that will not restrict the ability of FHA, VA, and GNMA to meet the need that exists.

Specifically, we urge the adoption of an FHA credit ceiling of $115 billion for 1986 and at least $100 billion next year, 1987. We urge Congress to act expeditiously, particularly now, to increase the FHA credit ceiling as it did in March when it raised the VA ceiling.

We also would urge you not to adopt, not to adopt the strings that the administration wants to attach. Those strings are essentially an imposition of increased fees, prohibition on putting fees—taking fees out of the mortgage, not allowing the homebuyer to finance the fees, and imposing a $40,000 income limit on FHA borrowers. We think those make no sense.

The effect of those proposals would be to dramatically raise the cost of participating in the FHA program while simultaneously limiting participating to those least able to afford the newly designed program.

With respect to VA, I would just add that the high level of refinancings and new activity is also expected to drive their volume upward. We think that this year they, too, will need another increase to at least $22 billion credit authority.

Let me turn to GNMA briefly. GNMA securities finance virtually all FHA-VA loans. On April 4, GNMA reached its statutory limit and shut down. The program disruption that this brings about is going to raise the interest rates on any FHA-VA loans that can be made at all, although, as I say, FHA is about to go out of business. Not because lenders, other than through the GNMA program, are generally unwilling to make FHA-VA loans.

GNMA and Freddie Mac have stepped in to securatize those loans. Those programs have significantly higher fees that we estimate will result in interest rates about half a percent higher to the homeowner than would be possible if GNMA were still there.

So, we urge Congress to raise the GNMA ceiling to $126 billion for fiscal 1986 and to a comparable level for 1987.

These numbers that I have indicated sound extraordinarily high, but again, please remember most of the lending is simply a rolling over of 8 years of FHA-VA loans. Eight years for $95 billion worth of FHA-VA loans are out there with rates of 12 percent or higher and all we're doing is rewinding the clock to put those loans back on the book at a lower interest rate.

I began with some thoughts on the dilemma posed by credit ceilings. Fundamentally, we don't think they can work because we don't think they have a clearly defined purpose. But, if we must have them and if we wish to avoid the constant disruptions of the FHA-VA market, we urge, at least, that there be a requirement on the agencies to notify Congress well in advance of actually going out—of their actually going out of business so that Congress has time and the industry and the homeowners have time to adjust their plans.

Let me close with one broader thought, if I may. The FHA-VA programs, together with GNMA securities, are a remarkable simply and efficient engine for generating capital for housing, especially for moderately price housing for moderate-income families.

If we're to have any Federal housing programs at all in todays environment, shouldn't these programs—FHA, VA, and GNMA—be homeownership programs to meet the kinds of programs we have, if we're to have any at all. They do three things that seem to fit perfectly into today's environment. One, these are programs that rely, to a maximum extent possible, on private first to market service loans; two, these are programs that make credit markets more efficient and which pass the benefits in terms of lower interest rates and adequate supplies of credit, straight through to homeowners, homeowners benefit; and three, these are programs that essentially require no subsidies; in fact, make money for the Government. Thank you very much.

Senator LAUTENBERG. Thank you, Mr. Lasko.

Senator LAUTENBERG. I have listened with interest to your comments and I'm struck by your mention of the refinancing that has been taking place. I was curious—do you know whether refinanced mortgages are at the face value of the principal remaining or at the value of the principal nemaining or are they typically extended beyond the obligation left on the original mortgage?

Mr. LASKO. The most typical situation, I think, that is taking place, is that the homeowner will get a mortgage for the unpaid principal balance, but the lender will frequently allow to be added to that mortgage an amount to cover cost of closing the loan, for points, but the most typical situation does not involve taking cash out of the deal.

Senator LAUTENBERG. Well, how about—what we've seen is an incredible increase in the value of housing in lots of areas around the country and my State, of course, is one of those.

Doesn't it reflect, in some way, the current market value. I mean if a house has gone from *x* to *2-x* since the mortgage was issued, the first mortgage. Are there any prohibitions to the homeowner increasing the size of the mortgage relative to the current market value?

Mr. LASKO. There are no prohibitions really. If a homeowner wishes to get more money out and if the value of the house can support an appraisal taking cash out, it can be done.

Now, the motivation——

Senator LAUTENBERG. Is it done? Have you seen it?

Mr. LASKO. Oh yes; a lot of it.

Senator LAUTENBERG. I would think so. I mean, if you can get a decent borrowing rate, why not extend your opportunity to collect some of the profit on the appreciation of the house and pay what could be a fairly reasonable interest rate.

Mr. LASKO. We have no hard data. This is all happening just in recent weeks.

Every possible combination is occurring, but I really believe the most typical thing is taking no cash out because that's the easiest refinancing that takes place. For instance, the Veterans Administration makes it relatively easy to refinance a mortgage if there is no cash taken out of the deal. They will wiave the need for a new appraisal, which is a real bottleneck in today's market.

Now, I'm talking mainly about the FHA-VA markets which have loan-to-value ratios. Many of these loans were just made in the last few years and there hasn't been a bit increase of this type.

Where you've got a conventional loan that maybe had a low loan value to begin with, we have lots of instances in the conventional market of people taking money out, maybe adding an addition to their house.

Senator LAUTENBERG. My concern—and I do support the expansion of the FHA and GNMA programs, the aid programs, because it has all kinds of effects. It provides what is ideal for so many families, an opportunity to house ones family.

The effects, of course, are the general economic ripples that you get from development. It creates communities, it creates jobs. It's a very positive influence. I do worry, however, about competition with those who would borrow in the future and, in fact, perhaps, increasingly the deficit, if the people are increasing the obligation, people. In fact; are going out there and getting more money the second time around than they originally had on the house and having the Government, in effect, subsidize some portion of the profit that is being realized.

So, I am concerned about that. And when you talk about a couple of hundred dollars a month opportunity for many families to reduce their obligations, it's very significant, what we're talking about. For middle-income families, that could be a lot of money, and I think we ought to try and be as helpful aa we can; wherever we can.

Obviously, there's a contrary view of those who hold that paper today and kind of enjoy seeing the money come rolling in. Very few people I know don't wish those who are investing short term now wish they had invested long term, you know, because of the interest yielding paper.

One of the things that you said, you stated your objection to user fees in the FHA and VA, particularly, because the funds help those program needs better to generate income for the Treasury.

Will the MBA support such fees and increases such as those proposed for the VA where we could direct program uses for the moneys generated by the loan origination fee?

Mr. LASKO. No, Senator, I don't think we would. We think the VA guarantee program is an entitlement that the veteran earned when he gave his service to his country and we think the program can be run on a businesslike basis without increasing fees and in a manner that would not generate the kinds of losses that the VA is currently experiencing. We think they're going through a period of time, as we come out of a high inflation period, as houses, perhaps, were not prudently appraised and values stopped increasing. But, we can get through that period and through better underwriting and better program management. We have excellent relationships with the VA. We think that that program can be preserved for the veteran in a manner and with the fees already in existence or even lower, bearing in mind that program until a few years ago had no up front fee.

We just don't believe, in that particular program, that fees should be raised as the vehicle for making it financially sound. We would much rather see better underwriting and better program management used as the vehicle. We had a group of our members work with the VA last year and came up with something over 20 little changes that could he made to the way the program is administered—appraisal practices, credit underwriting—that we think could cure the losses that they are incurring.

Senator LAUTENBERG. OK. That relates specifically, more specifically to VA than the FHA loans which are non-vet. How about those fees?

Mr. LASKO. The VA doesn't lose money. The FHA doesn't lose money. FHA is making money. In fact, quite a bit of money. The 2 points I would like to make; if I could take a moment on the FHA.

First of all, they now charge an upfront fee of 3.8 percent at the time the loan is closed and it's allowed to be put into the mortgage rate. A debatable practice, perhaps, but one that was agreed to by HUD and FHA at the time they moved the fee up front, in a good part, as a budget device to get all that fee up front recognizing a positive inflow of cash.

There is no need to increase the fee from an actuarial standpoint to a business standpoint because it covers their losses now. The administration wants to take that fee out of the mortgage so that the homebuyer would have to take that additional amount of their pocket; not just 3.8, they want to raise it to 5 percent. That would effectively double the cash outlay on a typical loan, double the down payment; if you will, for the typical FHA homebuyer.

We think that pulls the rug out from under the basic purpose of the program in the first place, which is to allow the moderate income family, with very little savings, to get into a home earlier in their life but on a sound businesslike basis. They're not subsidizing these loans remember.

The first point is that the higher fee and taking the fee out of the mortgage would be extremely harmful. It would be devastating to the FHA programs when you work the arithmatic.

And the second point, if I may, Senator. To raise fees above what is necessary to run a program prudently, strikes us as having given with the one hand, Congress creating a program; an FHA insurance program, to promote homeownership of housing and then to be taking it away with the other by charging fees over and above what's necessary tn run that program. If you don't want the program, don't have it, but don't kill it through the backdoor.

Talking about user fees; we believe in user fees that are necessary to cover the costs of running the program, but we don't believe in fees that go so far above the cost of running the program that they really represent a tax on housing.

Senator LAUTENBERG. We thank you, Mr. Lasko, for your testimony.

Mr. LASKO. Thank you, Senator.

[The statement follows:]

STATEMENT OF WARREN LASKO, EXECUTIVE VICE PRESIDENT, ON BEHALF OF THE MORTGAGE BANKERS ASSOCIATION OF AMERICA

Mr. Chairman and members of the Subcommittee, my name is Warren Lasko. I am Executive Vice President of the Mortgage Bankers Association of America.* Accompanying me today are Burton C. Wood, MBA's Legislative Counsel, and Brian D. Cooney, MBA's Associate Legislative Counsel.

We appreciate the opportunity to appear before you today to testify on the appropriations for the Department of Housing and Urban Development (HUD) for fiscal year 1987. We will discuss three issues. First is the necessity of establishing sufficiently high credit budget limits for the non-subsidized, user-fee supported Federal Housing Administration (FHA) mortgage insurance program. Second is the need for sufficiently high guaranty authority for the Veterans Administration (VA) entitlement-based Home Loan Guaranty Program. Third is the need to provide the Government National Mortgage Association (GNMA) mortgage-backed security (MBS) program with adequate guaranty authority so that it, in turn, can finance the needed level of FHA and VA loans.

Also, MBA wishes to note its strong opposition to any program restrictions as the "price" to pay for increased credit limits. Finally, with respect to the FHA, VA, and GNMA-MBS program levels, we will address the necessity of requiring official notification to Congress with respect to volume, pace of activity, and estimated time remaining before commitment ceilings are reached.

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*The Mortgage Bankers Association of America is a nationwide organization devoted exclusively to the field of housing and other real estate finance. MBA's membership comprises mortgage originators and servicers, as well as investors, and a wide variety of mortgage industry-related firms. Mortgage banking firms, which make up the largest portion of the total membership, engage directly in originating, selling, and servicing real estate investment portfolios. Members of MBA include:

- Mortgage Banking Companies
- Commercial Banks
- Mutual Savings Banks
- Savings and Loan Associations
- Mortgage Insurance Companies
- Life Insurance Companies
- Mortgage Brokers
- Title Companies
- State Housing Agencies
- Investment Bankers
- Real Estate Investment Trusts

MBA headquarters is located at 1125 15th Street, N.W., Washington, D.C. 20005; telephone: (202) 861-6500.

OVERVIEW

As mortgage rates have descended back to single digits for the first time in eight years, we are witnessing a turning back of the clock on mortgage market history. As oil prices have returned to the levels of an earlier era, the fear of inflation has diminished, and as a result, interest rates have declined dramatically. Housing finance, in turn, is returning to the more affordable and stable environment of the 1970s.

The wave of refinancings, currently accounting for from 45 to 55 percent of many lenders' new originations, constitute in a very real sense, the unwinding of the last seven years of high-rate financing. This is a healthy phenomenon because the refinancing of higher interest rate loans benefits both consumers and the government from the reduced risk of delinquency and foreclosure problems resulting from lower monthly payments. Such refinancings do not add to the amount of federally guaranteed debt outstanding; they merely constitute a rolling over of existing debt at lower interest rates. Moreover, because refinancing allows borrowers to reduce monthly payments, the additional discretionary income homeowners enjoy further stimulates the general economy.

As a result of the current single-digit mortgage interest rate environment, the need for sufficiently high levels for the Federal mortgage credit programs is greater than ever. The FHA, VA, and GNMA programs promote homeownership for moderate- and middle-income families and for veterans who otherwise would not gain access to mortgage credit at reasonable costs.

An additional concern, if we are to preserve an adequate and affordable supply of mortgage credit, is the Administration's FY 1987 budget proposal to impose so-called new or increased "user fees" on the home mortgage insurance and guaranty programs of FHA and VA, GNMA, the Federal National Mortgage Association (FNMA), and the Federal Home Loan Mortgage Corporation (FHLMC). MBA strongly opposes the imposition of these additional user taxes because the purpose of these fees is not for program use but to generate net income for the U.S. Treasury. MBA strongly supports efforts to reduce the deficit. To this end, we have supported spending cuts wherever possible, stressing that all programs, including Social Security, defense, and cost of living adjustments (COLAs) should bear a fair share of necessary cuts. If these are not sufficient to accomplish deficit reduction, Congress should be prepared to increase taxes, but such increases should be broad-based and not focused on any one sector of the economy.

In addition to user fees, the Administration's FY 1987 budget includes a proposal that would eliminate the provisions in current law that allow FHA borrowers to finance the up-front mortgage insurance premium (MIP) and closing costs, and would establish an income limitation of $40,000 per year for FHA borrowers. As a condition to raising the FY 1986 FHA credit ceiling, HUD also proposes that the FHA user fee be raised from 3.8 percent to 5 percent, as well as a prohibition on FHA financing for closing costs and user fees, in addition to prohibitions on making loans on second homes and on making investor loans. The effect of these FHA proposals would raise the cost of participating in the program, while simultaneously limiting participation to those least able to afford the "new" program.

By itself, the proposal to limit the financing of the up-front MIP and closing costs is enough to cripple the program. Such a prohibition effectively doubles the minimum downpayment that borrowers now make, thus eliminating one of the key advantages that the FHA program offers moderate- and middle-income homebuyers.

MBA supports continuation of FHA as a low-downpayment program. Borrowers currently must make a downpayment of 3 percent of the first $25,000 and 5 percent of the balance. For moderate priced dwellings costing $50,000 or less, a downpayment of 3 percent is required. Even though these are liberal downpayment requirements, default costs under the program are completely covered by up-front MIPs that are somewhat higher than the industry norm for private mortgage insurance to accommodate the riskier nature of the FHA programs.

In reviewing the Administration's proposals for the Federal housing programs, it is clear there is a lack of a cohesive, national housing policy. Rather, piecing together what has been said about housing over the past six years reveals not a doing, but an undoing of national housing policy. Yet the programs we are talking about today—FHA, VA, GNMA, FNMA, and FHLMC—are precisely the kinds of programs we should have if we are to have any housing programs at all. These programs rely to the maximum extent possible on the private sector; involve in the aggregate no subsidy; and help make markets more efficient.

CURRENT HOUSING MARKET ACTIVITIES

During the past few months, the country has seen an avalanche of activity in the housing market, a result of the single-digit mortgage rates that lenders have been offering for the first time in more than seven years. Families are stampeding lenders for funding for new homes, while others are rushing to refinance high interest rates on existing mortgages.

But the good news has a down side to it. Activity for federally insured mortgages is running at triple the pace of any month last year. The vehicle for funding federally insured mortgages has just dried up. GNMA, which guarantees the funds for virtually all FHA and VA loans in this country, announced on April 4 that they had already reached their statutory ceiling of $65.3 billion.

Lenders are already reporting that they are not taking any new applications for FHA or VA loans or are making financing contingent upon the availability of FHA insurance or VA and GNMA guaranty authority. On existing commitments, they are delaying the closings for homebuyers while they shop for other investors to fund their loans. While GNMA has already shut down until Congress acts, FHA authority to insure is expected to run out within the next 30 days.

Restrictive credit ceilings on the government's housing-related programs do not work. If there was ever any doubt, the events of the past few months have amply demonstrated that fact. The credit ceilings are creating bad fiscal and economic policy. These legislatively imposed ceilings wreak havoc on a marketplace driven so strongly by consumer demand. In this period of large deficits and budget constraints, the housing programs are bringing in money, and lots of it, to the Federal treasury. Further, housing is the one clear, bright spot on the economic horizon. Credit ceilings could well throttle the most promising engine of economic expansion.

The continuous threat of extended or periodic disruption in FHA, VA, and GNMA programs that is imposed by restrictive credit limits impairs the current and future liquidity of this market, because lenders and investors will no longer consider these programs predictable vehicles for mortgage finance. If the perception of investors and lenders toward these markets changes, this will result in generally higher mortgage rates.

The funds for the Federal mortgage credit programs are provided by private lenders and investors. These programs simply perform a guaranty and insurance function, paid for by the programs' users, except for the VA program, which does involve some expenditures but has been considered an entitlement program in return for veterans' service.

MBA urges Congress to set adequate ceiling levels for the Federal mortgage credit programs for FY 1986 and FY 1987 offered by FHA and GNMA to ensure their continued operation as demand programs and to recognize realistic limits for the VA program.

FEDERAL HOUSING ADMINISTRATION

MBA urges adoption of an FHA credit ceiling of $115 billion to accommodate present activity levels for FY 1986. MBA also urges the adoption of an FY 1987 credit ceiling of $100 billion for FHA.

For FY 1986, the HUD-Independent Agencies Appropriation law, P.L. 99-160, contains a limit of $60 billion for FHA. Due to the March 1 Gramm-Rudman sequestration cut, this level was reduced to $57.42 billion. When the current $57.42 billion ceiling is reached, this program will be shut down unless Congress approves a higher ceiling.

The unprecedented demands for housing credit have prompted real concerns about the FHA level, which at present activity volume will last 30 days or less. Interest rates are expected to decline slightly through the end of the calendar year; therefore, the volume of mortgage credit activity should continue at current or greater levels. Based on current activity levels, MBA projects that FHA will require $115 billion in insuring authority to satisfy demand for the remainder of FY 1986.

For FY 1987, the Administration's budget proposes that commitment authority for the FHA mortgage insurance program be set at $50.9 billion. In addition, the bipartisan FY 1987 budget plan, Senate Concurrent Resolution 120 (S Con Res 120), reported out of the Senate Budget Committee on March 19, imposes a ceiling of $39.4 billion on FHA. Both amounts are significantly less than the commitment ceiling set for FY 1986 of $60 billion. Actual activity in FY 1985 totalled $47.44 billion and, as mentioned, FY 1986 activity is running at approximately a $115 billion annual rate. MBA projects that this program will experience continued strong consumer demand in FY 1987, for the following reasons.

First, interest rates are expected to remain at the present affordable levels in the 9.5 percent range. This has spurred heavy refinancing activity and strong homebuying demand. MBA estimates that such demand will facilitate between 1.7 million and 1.8 million in housing starts in calendar year 1987. Second, FNMA and private mortgage insurers have tightened their underwriting guidelines, which has resulted in more consumer demand for the FHA product. FHA has always served the riskier borrower population, but because it carries a higher MIP it has, nonetheless, been actuarially sound. Third, the FHA Adjustable Rate Mortgage (ARM) program has been highly successful. The FHA-ARM, with its consumer protective interest rate caps of no more than 1 percent per year and 5 percent over the lifetime of a loan, has caused significant borrower demand.

For all of these reasons, MBA urges adoption of an FHA credit ceiling of $100 billion for FY 1987.

As mentioned above, the Administration's FY 1987 budget includes a proposal that would eliminate the provisions in current law that allow FHA borrowers to finance their MIP and closing costs, and would establish an income limitation of $40,000 per year for FHA borrowers.

With respect to the proposed $40,000 income limitation for FHA-insured borrowers, nearly one third of the people who used the program in 1985 would not have been eligible under this income limitation. Further, this income limit discriminates against borrowers in high-cost areas where an income above the proposed limit is necessary even to qualify for a high-cost area loan. In 1986, the limit would reduce the annual dollar volume of mortgage loans actually insured by FHA to $19 billion below the anticipated 1986 origination volume, resulting in the exclusion of roughly 317,000 families from the program.

Currently, in order to keep risks and fees at a reasonable level, the program is open to all families so that the risks inherent in the FHA program are spread over a large number of persons with varying degrees of financial capability, rather than being concentrated on a smaller number of less financially secure persons. Without this broader degree of risk-sharing, the fees would have to be raised beyond the point of affordability in order to cover losses.

MBA urges Congress not to adopt any of the Administration's proposed FHA program changes for FY 1986 or FY 1987.

VETERANS ADMINISTRATION

As previously noted, in past years the VA Home Loan Guaranty Program has been treated as an entitlement program and as such it was not designed to be actuarially sound. It was not subject to appropriated credit budget ceilings. However, while Gramm-Rudman continues this status for VA, the General Accounting Office (GAO) applied sequestration to the program for FY 1986. The question of whether GAO's interpretation that sequestration applied to the VA Home Loan Guaranty Program is correct or not has not been addressed by Congress, but for FY 1986, the VA indicated that it would abide by the sequestration cut, and that it would likely shut the program down by the end of March. Congress provided relief by passing HR 4130 (P.L 99-225) in time to avert the impending shutdown, but markets were disrupted at that time, and the continued wave of refinancings since then may prove the $17.4 billion ceiling in P.L. 99-225 to be inadequate for FY 1986. On April 1, the VA instituted a monitoring system, known as the Loan Authorization and Tracking System, or LATS, that should provide an adequate estimate and a way for Congress to know if higher volume limits should be provided.

Because of the continuing demands placed on this program due to the high level of refinancings and new loan activity, MBA believes the VA Home Loan Guaranty Program activity volume will reach $22 billion for FY 1987.

GOVERNMENT NATIONAL MORTGAGE ASSOCIATION

MBA urges the adoption of a GNMA-MBS credit ceiling of $126 billion for FY 1986 and a credit ceiling of $125 billion for FY 1987.

The GNMA-MBS program provides a means for homebuyers, primarily moderate- to middle-income families and veterans, to obtain competitive access to the capital markets via the secondary mortgage market. Because the GNMA-MBS is a secondary guaranty program, any restriction on the GNMA-MBS program is a back-door attack on the underlying FHA and VA primary loan programs because such restriction would limit the activity levels of these programs.

For FY 1986, the HUD-Independent Agencies Appropriations law, P.L. 99-160, contains a limit of $68.25 billion for GNMA. The March 1, 1986, sequestration cut reduced this level to $65.3 billion. As noted, on April 4, 1986, GNMA announced that it had reached this limit, and on that date, the GNMA program shut down. Without Congressional approval of a higher GNMA limit to back MBSs, mortgage lenders have been forced to curtail FHA and VA lending severely. In fact, some lenders have stopped originating new FHA and VA loans, while others have made loans contingent on the availability of FHA insurance or VA and GNMA guaranty authority. This shutdown has caused severe market disruption in that many borrowers with FHA and VA commitments are having their loan closings delayed.

This program disruption might raise the interest rates on FHA and VA mortgages as lenders work to find alternative investment vehicles other than GNMA to fund those loans. Although FNMA and FHLMC recently began programs for securitizing FHA and VA mortgage loans to assist the flow of funds to housing until GNMA credit authority is increased, these programs will operate at higher costs than GNMA's because FNMA and FHLMC demand higher yields on their mortgage securities and their cost of funds is greater than GNMA's. These increased costs will be passed on to the homebuyer. We estimate that borrowers will pay between 1.5 and 2.5 discount points (a discount point is 1 percent of the loan amount and must be paid at closing) if their loans are delivered into securities guaranteed by FNMA or FHLMC. In fact, the discount points charged to homebuyers may be higher, depending upon the market's receptivity to FHA and VA loans being packaged and sold through FNMA and FHLMC securities.

Congress has in the past clearly endorsed GNMA. It is a self-supporting program that has not cost the American taxpayer a dime over the past 16 years and, in fact, netted a $236 million profit for the government in FY 1985. It currently has reserves in excess of $1 billion.

Because of the high volume of new mortgage loans and refinancings currently taking place in the FHA and VA programs, MBA requests the GNMA-MBS ceiling be raised to $126 billion for FY 1986.

For FY 1987, S Con Res 120 provides for a $55 billion ceiling on GNMA. According to Senate Budget Committee staff, the Congressional Budget Office (CBO), which supplied this estimate, calculated this figure based on net commitment activity—even though for budget scorekeeping purposes, these commitments are drawn based on gross commitment demand. Under both the FHA and GNMA programs, there is a degree of "fallout," which accounts for the difference between net and gross activity. This fallout occurs when an FHA borrower does not qualify for a loan, decides to go to another lender, or for a variety of other reasons fails to close a loan after an application has been made. Similarly, under the GNMA program, a lender can overestimate production and fail to deliver mortgages for the full amount of the guaranty commitment approved by GNMA. Therefore, the CBO's figures are based on data and assumptions that are seriously understated. Further, we believe CBO has underestimated the actual levels of activity expected in the current and foreseeable interest rate environment.

MBA believes that the proposed ceiling in S Con Res 120 of $55 billion is grossly inadequate. Low interest rates are projected to continue into the next fiscal year. This will facilitate continued high homebuying demand and refinancings for both the FHA and

VA programs. As a result, MBA requests a GNMA-MBS ceiling of $125 billion for FY 1987.

NOTICE OF PROGRAM ACTIVITY LEVELS

In light of the current events that require emergency action to accommodate FHA, VA, and GNMA levels, MBA suggests that flexibility and procedural safeguards are an essential ingredient of the credit budget mechanism. MBA urges that language be adopted that would require official notification to Congress by the HUD Secretary and the VA Administrator with respect to present volume, pace of activity, and the estimated time remaining before commitment ceilings are reached in the FHA, VA, and GNMA programs.

During consideration of the FY 1986 budget appropriations bill, the House Report, H Rpt 99-212, noted, "Finally, the Committee will reconsider any limitation that, potentially, may be programmatically restrictive." The Senate Report, S Rpt 99-129, went further by adding a notification requirement. It states at page 20, "The Committee directs the Department to closely monitor both FHA and GNMA program performance during fiscal year 1986 to assure the limitations provided for these programs do not obstruct the housing recovery." The Senate Report, on page 21, further noted that an increase in the GNMA limit might well be necessary: "The Committee is concerned that as FHA and VA loan guarantee activity increases, additional requirements for secondary market sales can be expected. Should the current surge in new mortgage demand continue, an increase in the GNMA limitation may well be required."

MBA supports the inclusion of stronger language in light of the lack of notification that led to the shutdown of the GNMA program on April 4. Congress should be notified by the Secretary of HUD and by the VA Administrator at the earliest possible time that the ceilings are being approached in order to take appropriate and timely action.

As such, MBA suports the following legislative language, which appears in Section 4 of HR 4602, the "FHA and GNMA Credit Commitment Assistance Act of 1986," that would provide the appropriate notice without burdening the administrative agencies:

"(a) In General. — The Secretary of Housing and Urban Development shall notify the Committee on Appropriations and the Committee on Banking, Housing, and Urban Affairs of the Senate and the Committee on Appropriations and the Committee on Banking, Finance, and Urban Affairs of the House of Representatives if the cumulative commitments issued through the end of any month of a fiscal year by the Federal Housing Administration to insure loans under the National Housing Act, or by the Government National Mortgage Association to issue guarantees under section 306(g) of the National Housing Act, exceed the pro rata share of the aggregate commitment authority available to such Administration or Association that is applicable to the expired portion of the fiscal year. Such notification shall be made not later than 30 days after the end of the month involved.

(b) Rule of Construction. — No provision of this section may be construed to establish any limitation on the cumulative commitments that may be issued during or through any month by the Federal Housing Administration or the Government National Mortgage Association."

This language would impose a duty on the HUD Secretary to report to the Congress in a timely fashion whenever it appears that the commitments issued under the FHA mortgage insurance or the GNMA-MBS guaranty programs are being drawn down at such a rate as to pose the possible danger of reaching the program commitment ceilings. Prompt notification will enable Congress to react to avoid the possibility of program moratoria whenever it appears that commitments are being utilized at such a rate as to pose the possibility of running out of commitment authority before the end of the fiscal year. This section avoids imposing a blanket reporting requirement. A report is required only when it appears that program usage in any month, on a cumulative basis, is proceeding at such a pace that commitment authority could be exhausted. HUD, GNMA, and VA currently have tracking systems that provide this information. However, the proposed language also makes it clear that this is not an allocation scheme to ration commitments on a monthly basis. Similar language should be adopted to protect the VA home loan program.

OUR NATIONAL HOUSING POLICY

Shelter has traditionally been viewed as one of the basic necessities of life. In light of that, it has for nearly a century been a fundamental element of our national policy. However, the current Administration is conducting an irrational attack on this national priority.

There is an immediate need for a viable, well-thought-out housing policy. This is so because homeownership goes hand in hand with the promotion of family and other traditional values. The framework of such a policy should provide for decent, safe, and sanitary housing at affordable prices for all Americans. In addition, housing policy should facilitate the steady flow of mortgage credit at reasonable rates of interest.

This policy can be achieved through maximum reliance on the private sector, which is possible through the Federal housing credit programs. As mentioned, the funds for the FHA, VA, GNMA, FNMA, and FHLMC programs are provided by private lenders and investors. The Federal government's role in these programs is limited to providing a guaranty and insurance function. This private-public partnership should be preserved because it ensures efficiency in the marketplace while costing the taxpayer nothing, and aids those who need its services the most—the first-time homebuyer and the moderate- and middle-income homebuyer. Also, the Federal government provides an umbrella of legislative and regulatory overview that protects all homebuyers, both new entrants and others.

In reflecting upon the current role of the Federal mortgage credit programs, the existing programs go a long way toward achieving the policy objective of providing decent and safe housing at affordable prices for all Americans. In addition, the FHA, GNMA, FNMA, and FHLMC programs promote this objective through a private-public partnership without costing the government a dime. (The VA is an entitlement program in return for veterans' service and has required some expenditures in the past.) One would think, therefore, that if we are to have any housing programs at all, these are precisely the kinds of programs in the present environment we would want to have.

CONCLUSION

MBA wishes to alert this Subcommittee and Congress to the importance of allowing FHA, VA, and GNMA to fulfill consumer demand for mortgage credit. In the early 1980s, homeownership dreams were stifled by unaffordably high mortgage interest rates. This pent-up demand is now being unleashed. Many of these borrowers are purchasing their first homes because of the opportunities that the FHA and VA programs offer. Others are moderate- and middle-income families who rely on the FHA and VA programs to assure a stable, affordable supply of mortgage credit.

MBA urges Congress to adopt adequate credit budget limits for the FHA and GNMA programs and to recognize realistic activity levels for VA so that the American dream of homeownership does not fade, and also urges the Subcommittee not to adopt any of the Administration's recommended FHA program changes, which would severely limit the program's availability. In addition, appropriate legislative language should be included that will allow Congress to monitor the FHA, VA, and GNMA-MBS programs throughout the year to ensure that access to them is not restricted by ceilings or by administrative inaction.

MBA appreciates the opportunity to testify before this Subcommittee and would be happy to answer questions or provide additional information, as necessary, for inclusion in the hearing record.

ENVIRONMENTAL PROTECTION AGENCY

STATEMENT OF ANDREW A. HOLTAN, CHAIRMAN, GOVERNMENT AFFAIRS COMMITTEE, NATIONAL ENVIRONMENTAL TRAINING ASSOCIATION.

Senator LAUTENBERG. We ask Mr. Andrew Holtan to come to the witness table, please.

Welcome, Mr. Holtan. If you would; state your organization and affiliation.

Mr. HOLTAN. Thank you, Mr. Chairman.

Good morning, Mr. Chairman and members of the committee. This testimony is presented on behalf of the National Environmental Training Association. As chairman of the Governmental Affairs Committee for NETA, I am providing the testimony in recognition of need for a national commitment to the development of a competent environmental work force.

My testimony will summarize the current status of training capabilities and present recommendations for future program direction.

NETA is a not-for-profit association of professional environmental trainers with a membership that represents all environmental disciplines.

My testimony today will focus on the training needs and water quality and toxic and hazardous waste. However, I would also like to bring to the committee's attention that there is a similar urgent need in the area of air pollution, noise, solid waste, and especially drinking water.

During the past 5 years, training programs supported by your committee and Congress have reached over 1,000 small communities. A substantial number have been brought into compliance through on-site operator training and technical assistance. We also managed to increase local and State support for self-sufficiency and the end result has been improved compliance reportinq, local financial management, as well as reduced inflow and infiltration and addressing other issues much as energy and sludge handling.

The average cost per plant for this assistance has been between $8,000 and $9,000. A more detailed case history will be presented later this afternoon by Dr. Ennel from the South Carolina Water Quality Institute. EPA is also supporting the State-to-State project with NETA, a project which helps States develop more effective, self-sufficient operator training. We're currently working in 17 States and have listed success stories in Vermont, Maryland, and Georgia, and you could add several more to those successes.

We also know that EPA is pleased with the overall success of the Outreach Technical Assistance Program because the agency is initiating a complementarv EPA staff for on-sit technical assistance as well.

Despite this progress, however, we do not believe that the program can be terminated yet. There are over 12,000 small facilities in this country and many of them have compliance problems and training needs. They are obviously concerned about fiscal year 1987 funding and the implications of a balanced budget. We had hoped, but had not expected, that EPA would request funds in its budget. Because EPA has not, we are requesting that this committee seriously consider a $1.5 to $2 million add-on.

They're also requesting that add-on funds for section 106 for the use of States and replacing support for training as the 104 funds are reduced.

COMPETENT WORK FORCE LACKING

The balance of my testimony focuses on hazard waste training and the work force crisis. The lack of a competent work force in the hazardous waste field continues to be a growing concern. In it's July 1985 report, the House Committee on Appropriations noted that the single greatest constraint to more effective environmental programs is the lack of a qualified and skilled environmental work force. And that since the States bear the first-line responsibility for program operation, the crisis in work force training is most critical at that level.

In March 1985, the Office of Technology Assessment in their Superfund strategy report noted that there was a shortage of experienced technical experts in several fields and that may, in fact, explain the lack of quality performance. The report also goes on to note that States have difficulties obtaining and maintaining exerienced technical professionals. This further substantiates the need of testimony of the past 3 years in which we have noted that the States are, in fact, the training ground for the Federal Government and the private sector.

The crisis proportions in this area are summarized by the OTA report. They are that there are not enough technical specialists, little time to control sites, and a planning mistake now could result in an environmental crisis for years and decades to come.

In September 1985, the GAO issued a report titled, "Assessment of EPA's Hazardous Waste Enforcement Strategy." They reported that: (1) EPA strategy does not identify the training or skills mix needed; and (2) that there is evidence of apparent training and skills shortage.

In October 1985, Time magazine headlined, "The Poisoning of America '85—Toxic Wastes" and portrayed the dilemma with a half skull, half human head sinking and disintegrating in a pool of hazardous waste. The article quotes: "The longer we wait, the greater the damage will be and the higher the final cleanup cost will be."

NETA supports fiscal responsibility and State self-sufficiency for environmental training. We also realize that an abrupt and complete elimination of all Federal support would result in the near abolishment of many training programs in many States. Therefore, we are recommending an orderly transition period in order to enable the States to prepare for this enormous responsibility and to develop individual State strategies and plans.

NETA recommends the following: (1) Establish a training function at U.S. EPA headquarters and each U.S. EPA region; (2) continue on-site technical assistance and fiscal management assistance; (3) increase section 106 funding to help States implement training plans of action; and

(4) conduct a detailed evaluation of hazardous waste traininng needs and resources.

This study should be carried out by those organizations and State agencies which are actually involved in training and lead to the development of model State training plans for building a fully effective work force for hazardous waste management, compliance, and enforcement.

We have also provided in the testimony specific physical recommendations for the committee's consideration.

I thank you for the opportunity to present this testimony and I would be happy to respond to any questions that you may have.

Senator LAUTENBERG. Thank you, Mr. Holtan. I find your testimony interesting and somewhat in agreement with many of my own views.

Perhaps you know I sit on the Environment and Public Works Committee and have been an activist on the reauthorization of Superfund and providing EPA the facilities with which to do the job that they have to do. So much of it does center around adequate training and experience. The educational base for lots of people is very requiring on Superfund and we don't always have enough of an inducement to attract those kinds of people nor do we offer enough stable employment base to say, "OK, it's worth the risk in going with the Government."

We have our annual budget meetings and that is why I'm hoping that we will have a Superfund reauthorization at a decent level to attract peope so we can start to get rid of the toxic waste blight on our society.

You indicate, in your statement, Mr. Holtan, that you agree that technical training is essentially a State and local responsibility. At the same time, you argue that Federal funding should be maintained for those functions, provide for a period of transition. Did you make mention in your testimony how long a transition period you think funding ought to be available for?

Mr. HOLTAN. I have not made mention in the testimony, however, we have been working now with 17 States for going on 3 years helping them develop a State training plan. Each one is unique to resources and needs within that given State. Those States are probably going to require a year or two additional funding to maintain or achieve self-sufficiency.

Some 33 other States, however, have not even begun to address this problem. I think it is a 5-year effort from the time you recognize the need to the time that you have, in fact, achieved 70- or 80-percent self-sufficiency.

Senator LAUTENBERG. Does it, at any point, make sense to start phasing out Federal support for technical assistance with respect to the operation of wastewater treatment plants, hazardous waste management, other kinds of facilities of a similar nature?

Mr. HOLTAN. Fifteen years in State government and I would have to say, yes, it does. I am not recommending elimination of Federal support because I think there is always a Federal role that should be maintained. However, I do think that the States need to put specific resources and dedicate them and make a commitment in support of training. Otherwise, you're in the very dilemma that you just mentioned where it's soft money, it's not going to be around, possibly next year, and so the more experienced individuals will find more permanent types of employment.

Senator LAUTENBERG. It's a problem, because while we encourage the States to make their own decisions and to manage their own affairs wherever it's possible, certainly we don't want to legislate State involvement. But we do have the obligation to protect human health. That's a battle that's going to continue to be fought here. Frankly, I think the Federal Government has an obligation to provide as much assistance as it can.

What affects one area's environment eventually gets to affect another area of the environment.

Thank you, Mr. Holtan.

[The statement follows:]

STATEMENT OF THE NATIONAL ENVIRONMENTAL TRAINING ASSOCIATION

INTRODUCTION

This testimony is presented on behalf of the National Environmental Training Association (NETA) in recognition of the need for a national commitment to the development of a competent environmental workforce. This testimony summarizes the current status of training capabilities (including an overview of what has been accomplished with previous Federal appropriations), and presents recommendations for program direction and future appropriations.

NETA is a not-for-profit association of professional environmental trainers, supported primarily by grants, member dues and services. An environmental trainer is a vocational instructor in the environmental field or a "troubleshooter" who provides technical assistance in the operation and maintenance of water and wastewater treatment plants (as well as in other types of environmental facilities and systems).

Environmental trainers may be employed by community colleges, universities, state training centers or local/state/federal government, as well as by consulting firms, industry and other private sector firms.

NETA's membership encompasses all sectors of environmental training; however, this testimony focuses on training needs in water quality control and toxic/hazardous wastes. The urgent need for training exists as well in the other environmental fields (air and noise pollution, solid waste and drinking water).

TRAINING & TECHNICAL ASSISTANCE TO PUBLICLY OWNED TREATMENT WORKS (POTWs)

During the past five years, training programs supported by your Committee and Congress have reached over a thousand small communities and their wastewater treatment facilities. A substantial number of these plants have been brought into compliance primarily because of on-site wastewater treatment plant operator training and technical assistance. Training programs have also increased local and State support operations and maintenance, operator training, and user charge systems for self-sufficiency; they have improved compliance reporting and local financial management; reduced infiltration, inflow problems and energy and sludge handling costs. These improvements have been achieved very cost-effectively; the average cost per plant assisted has been between $8-9,000. Without reflecting on overall EPA or State implementation of the National Municipal Policy, we believe that this program has been the most successful approach for achieving small facilities compliance.

In addition, EPA is supporting the State-to-State Project with NETA. The multi-year project is currently helping States develop more effective, self-sufficient operator training and integrated municipal facilities compliance programs. For instance, Vermont has added training staff to its program, Maryland is using State aid for the Chesapeake Bay Technical Assistance Project, and Georgia has reworded its state plan to include technical assistance as an effective enforcement tool. NETA strongly supports the development of State self-sufficiency in the area of training and through our contact with the States, we believe most of them agree with this concept. Currently, the Section 104 (g)(1) grants are leveraging substantial additional amounts of State funds and State staffing. In addition, we understand that the $600,000 reduction in the FY 1986 add-on funds reflects Congressional encouragement to States for self-sufficiency. in both FY 1985 and FY 1986, EPA has been requiring increased State matching funds for these grants and States have been very supportive.

We know that EPA is pleased with the overall success of the outreach technical assistance program because it initiated a complementary EPA staff on-site assistance program this year that will reach additional small communities in nearly every State. The program seems to make sense to everyone involved since it is producing outstanding State and local results for a very small Federal investment.

Despite this progress, we do not believe the program can be terminated yet. There are over 12,000 small (under 1 million gallons per day) municipal treatment facilities in the country, most of which have some compliance problems and training needs. Plants that the program has helped come into compliance once are not necessarily staying in compliance. The momentum that has developed in States for expanding and integrating their O&M, operator training and compliance programs will be under even greater competing pressures given the projected reductions in Federal funding and the 1988 compliance deadline.

We are obviously concerned about FY 1987 funding, recognizing the implications of balanced budget requirements and the program's reliance on add-on funding. We have hoped, but not expected, that EPA would request funds in its budget. Because it has not, we are requesting that you seriously consider a $1.5 - $2 million add-on for one more year. This will put States and EPA on notice and provide needed time for implementing alternative approaches. Although we believe that direct 104 (g)(1) funding is preferable, we are also proposing an alternative approach.

In its Report to Congress, EPA expressed support for State use of both Clean Water Act Section 106 program grants and Section 205(g) construction management assistance grants to develop improved operations and maintenance and operator training programs. There has been some, but very limited, State progress in this area. Congressional support for incorporating operator training and compliance technical assistance as integral parts of the National Municipal Policy implementation strategy and as a national 106 and/or 205(g) funding priority would result in needed Federal transition funding in many States.

We are aware that the Committee has provided municipal facilities compliance guidance and additional resources to EPA and States over the past few years. To the extent you do so again in FY 1987, and as an alternative to direct 104 (g)(1) add-on funding, we ask you to encourage EPA and State use of these and other Federal funding sources to continue supporting our mutual objectives.

HAZARDOUS WASTES TRAINING: A WORKFORCE CRISIS

The lack of a competent hazardous wastes workforce continues to be an even greater concern to our country. In fact, too few competent and experienced professionals in the hazardous wastes field have significantly impeded our efforts to effectively manage hazardous wastes and a workforce crisis in this area is imminent, unless we do something to prevent it.

The House Committee on Appropriations, in its July 1985 report, stated that:

> . . . the single greatest constraint to more effective environmental programs is the lack of a qualified and skilled environmental workforce. In the near future, substantial increases in the need for trained environmental staff are projected for industry, federal, state and local governments. These staff shortages affect all environmental programs, but appear most severe in the hazardous waste program area. Since the states bear first-line responsibility for program operation, the crisis in workforce training is most critical at that level. (p. 28).

In a report by the Office of Technology Assessment (OTA) on the Superfund Strategy in March 1985, the following observations were made:

> In case histories of Superfund cleanups by OTA and others there is evidence of significant problems in the quality of technical work. . . . Moreover, a shortage of experienced technical experts in several fields may explain a lack of quality performance now and it may cause a major bottleneck in an expanded Superfund program. . . .(p. 32).

As the report notes the lack of competent and experienced professionals in the hazardous wastes field is most acute at the state level:

> . . . many states lack technical know-how and people to assume major responsibilities for leading cleanups, or to carry out other aspects of the Superfund program such as site identification, selection, and long-term monitoring. . . . For the most part, states have difficulties obtaining experienced technical professionals. Even with current spending, the demand for such professionals is so great that most states cannot offer competitive salaries. (p. 36).

The states, as the training ground for the federal government and the private sector, must continually hire inexperienced people and attempt to develop competencies with severe limitations on training and financial assistance.

The crises proportions of this workforce need are well summarized by the OTA:

> . . . not enough technical specialists, little time to control sites to prevent great damage to public health and the environment, and costs so great that they might be impossible to meet. In other words, a planning mistake now based on an underestimate of the national cleanup problem could result in an environmental crisis years or decades from now. (p. 17).

The General Accounting Office (GAO) followed the OTA report with an "Assessment of EPA's Hazardous Waste Enforcement Strategy" in September 1985. The GAO reports:

> - EPA's strategy does not identify the training or skills mix needed to meet the 90-percent compliance goal.
>
> - There is evidence of apparent training and skills shortages, particularly in the groundwater-monitoring area. (p. 13).

The report referred to congressional testimony provided on April 29, 1985, by the EPA Acting Assistant Administrator for Solid Waste and Emergency Response, who stated that state personnel structures often result in a state's inability to attract and maintain staff skills important to the RCRA program. The authors of the GAO report also stated that the regions and states they visited also had skills mix and training concerns. Both EPA and State hazardous wastes workforces have been identified by very credible sources as experiencing shortages of qualified staff.

On October 14, 1985, the cover of Time Magazine graphically portrayed "The Poisoning of America '85 - Toxic Wastes" by showing a half skull/half human head sinking and disintegrating in a pool of hazardous waste. This may be taken as evidence that the entire country is focusing its attention on this immediate problem. We must act responsibly and quickly. We cannot afford to ignore the plight of the workforce in the hazardous waste field. As the Time article quotes, "The longer we wait, the greater the damage will be and the higher the final clean-up cost will be."

The findings of the OTA and GAO reports, as well as those from Time's article, correspond quite closely to personal observations made by several members of this NETA Governmental Affairs Committee.

PROGRAM RECOMMENDATIONS

While the National Environmental Training Association supports fiscal responsibility and state self-sufficiency for environmental training capabilities, we realize that an abrupt and complete elimination of all federal support would result in the near-abolishment of training in most states. Therefore, an orderly transition period is necessary to enable states to prepare for this enormous responsibility and to develop individual state strategies which will gradually reduce federal assistance and increase local funding over a discrete period of time, ultimately resulting in state training capabilities that are primarily self-sustaining and programmatically sound.

We are now in this transition period and the National Environmental Training Association recommends that the following actions and activities be undertaken and supported by federal appropriations:

Establish a Training Function at U.S. EPA Headquarters and Each U.S. EPA Region

Within the U.S. EPA Office of Water, a focal point must be established and maintained for the training function and resources must be provided for staff positions to plan, direct, and provide overview and training grant management. With clearly-defined staff responsibilities for training, the effectiveness and efficiency of wastewater training and technical assistance activities can be maximized.

Continue On-Site Technical Assistance and Fiscal Management Assistance

The technical assistance projects begun under FY82 and FY83 appropriations are filling critical training needs at small facilities — especially those facilities not in compliance with their discharge permits. As administered by U.S. EPA, this use of federal funds is establishing the seeds of state self-directed and self-sufficient technical assistance outreach programs. These efforts are already bearing fruit and should be continued and expanded through FY87 funding under Section 104(g)(1) of P.L. 92-500.

Increase Section 106 Funding to Help States Implement Training Plans of Action

The development and implementation of state training plans will require a significant investment of human, material and financial resources. Federal support should be provided, under Section 106 of P.L. 92-500, to help states develop and implement their training plans of action. It is recommended that 106 appropriations be increased by 10% in FY87 and that these added monies be used exclusively to support the multi-year development and implementation of state training plans. This federal support will represent interim financial assistance toward the ultimate goal of self-sufficiency.

Conduct a Detailed Evaluation of Hazardous Waste Training Needs and Resources

Direct EPA to undertake a detailed evaluation of hazardous wastes training needs and resources in at least three states. This study should be carried out by those organizations and State agencies which are actually involved in training and lead to the development of model State training plans for building a fully effective workforce for hazardous waste management, compliance and enforcement.

FISCAL RECOMMENDATIONS

U.S. EPA's Report to Congress and NETA's program recommendations outlined above present significant challenges for environmental training. These challenges require a national commitment backed by financial support. The National Environmental Training Association recommends the following federal appropriation levels to support the environmental training goals recommended herein:

WATER QUALITY: P.L. 92-500

Section	Amount	Purpose
104(g)(1)	$2,000,000	(1) to continue on-site training and technical assistance and financial management assistance; (2) to small waste water treatment plants to provide technical assistance to state pollution control agencies
106	For FY85, a 10% increase over current level of total Section 106 appropriations	These added monies will be used exclusively to assist states in quickly achieving the goal of the training plans of action: fiscal and programmatic self-sufficiency
HAZARDOUS WASTES:		
RCRA	$1,000,000	(1) for conducting a detailed evaluation of hazardous waste training needs and resources in at least three states; (2) developing model State training plans, and; (3) providing technical assistance to all states for the development of programmatic and fiscal self-sufficiency.

The National Environmental Training Association appreciates this opportunity to provide Testimony on behalf of the environmental training profession.

Bibliography

[1] "Report to Congress on Training for Operators of Publicly Owned Wastewater Treatment Plants." 1985, Environmental Protection Agency, Washington, DC.

[2] "Superfund Strategy." Office of Technology Assessment, Congressional Board of the 99th Congress. OTA - ITE - 253, March 1985. Congressional and Public Affairs Office, Office of Technology Assessment, U.S. Congress. Washington, DC.

[3] "Assessment of EPA's Hazardous Waste Enforcement Strategy." GAO/RCED - 85 -166, September 5, 1985. General Accounting Office, United States Government. Washington, DC.

[4] "The Poisoning of America '85 - Toxic Wastes." Time Magazine, Inc. October 14, 1985.

[5] "July 1985 Report." Subcommittee on Housing & Urban Development and Independent Agencies of the Committee on Appropriations of the House of Representatives. Washington, DC.

SUBCOMMITTEE RECESS

Senator LAUTENBERG. With that we conclude this mornings hearing.

We will recess until 1:30 this afternoon at which time we will continue to hear testimony from public witnesses concerning HUD and FPA's fiscal year 1987 budget.

[Whereupon, at 12:02 p.m., the subcommittee was recessed to reconvene at 1:30 p.m., the same day.]

(AFTERNOON SESSION, 2 P.M., TUESDAY, APRIL 29, 1986)

NONDEPARTMENTAL WITNESSES

ENVIRONMENTAL PROTECTION AGENCY

STATEMENT OF RUSS DONOGHUE, PROGRAM MANAGER, RURAL WATER ASSOCIATION OF UTAH, ON BEHALF OF THE NATIONAL RURAL WATER ASSOCIATION

OPENING REMARKS

Senator LEAHY. I apologize for being late. We had Republican and Democratic caucus meetings until 2 o'clock, and my agenda matter came up at 1:45. It piled things up a bit.

Why don't we start with Mr. Donoghue, the program manager of the Rural Water Association of Utah, who is here on behalf of the National Rural Water Association.

Go ahead, sir.

Mr. DONOGHUE. Mr. Chairman, my name is Russ Donoghue. I am the former program manager for the Rural Water Association of Utah. I am here on behalf of the National Rural Water Association to thank you and this committee for the support you have given the Rural Water Training and Technical Assistance Program in the past and to request your continued support for the program in the Environmental Protection Agency fiscal year 1987 budget.

For 5 years, I have operated the program in Utah, supervised by a 12-member board of directors representing the rural water systems throughout the State of Utah. We carried out an average of 13 training sessions a year, similar to the training sessions that are held in the State of Vermont by Brian Burns.

Senator LEAHY. Incidentally, I have heard excellent reports about your work with the small water systems in Vermont. I think without your technical assistance, they never would have complied with the overly technical Federal statutes. I appreciate that very much.

Mr. DONOGHUE. Thank you, sir.

At a typical training session, we would have an average of 30 people attend from small water systems. I believe Vermont averages somewhat in the 20 to 25 range. We would get people both from operations and management to the sessions. We would cover such topics as disinfection, trouble shooting of small water systems, as well as vital things pertaining to the compliance issues under the Safe Drinking Water Act.

One major accomplishment of these training sessions, Mr. Chairman, has been in Utah that I think we have had an effect on the increase in clients of small water systems in meeting the requirements of the Safe

Drinking Water Act. Also, they have a better understanding of those rules and regulations.

In addition to the training efforts, I also traveled in the State of Utah providing technical assistance to those small water systems. This type of assistance involved things with operations as you referred to, items of managerial problems. We are finding those to be more critical as our program progresses. And then the one-on-one actual training in the trenches, if you will, of people in rural communities so that hopefully, if they have a problem, they can do it on their own the next time.

Perhaps one good example of our impact on small water systems in the State of Utah occurred in the summer of 1985, when we helped with the work and in close cooperation with our State regulatory agency, 11 small systems in the State who had been placed on orders. Those orders came for a variety of reasons, most of them due to springtime flooding.

We were able to help those systems get off of "boil" orders through providing technical assistance and seeing them through this training time from the beginning until the end, and we worked very closely with the Utah Bureau of Public Water Supplies, the State regulatory agency, in seeing that these 11 systems were able to, once again, provide safe drinking water to the constituents.

Programs stemming under this operate in 34 States. It has been very effective in improving operations and maintenance. We also have local support from rural water systems. This improvement in these systems has largely helped them meet the regulations of the Safe Drinking Water Act.

It is rural folk helping rural folk with a very complicated set of regulations that the small water system personnel oftentimes have a hard time understanding. That is because many of them are part time; many of them are volunteer.

We are requesting an appropriation of $3 million to allow this program to expand to 41 States. We believe this is of particular importance in the light of the fact that as you have heard in testimony, the new safe drinking water agreement will significantly increase the burden on the small systems. In fact, the new bill authorizes an entire new $10 million technical assistance program for small systems.

We urge the committee to also consider funding this new progran at the full authorized level. That concludes my statement, Mr. Chairman. I thank you.

Senator LEAHY. Thank you, and again, in my own State I thank you.

What would happen if the Congress just made a 20-percent across-the-board cut in a whole lot of budgets, including yours? I am not suggesting it is going to happen. I hope it doesn't, but what would be the effect of that, a 20-percent cut across the board in your budget?

Mr. DONOGHUE. We would continue to operate. We would try and strengthen the program through better quality training; possibly not as often, possibly making them 2-day sessions rather than a 1-day session where adaptable. We would like to expand the program because there are States that would like to have us come in, but the funding is just not there.

Senator LEAHY. There would be no way of expanding, though, if you had that kind of cut? You couldn't go into these extra States you are talking about?

Mr. DONOGHUE. No, no, sir.

Senator LEAHY. Thank you, and I appreciate your coming here, Mr. Donoghue, very much, and your testimony.

Mr. DONOGHUE. Thank you.

[The statement follows:]

STATEMENT OF RUSS DONOGHUE, MEMBER, NATIONAL RURAL WATER ASSOCIATION

Mr. Chairman, my name is Russ Donaghue and I am the former Program Manager for the Rural Water Association of Utah. I am here on behalf of the National Rural Water Association to thank you and this Committee for the support you have given the rural water training and technical assistance program in the past and to request your continued support for the program in the Environmental Protection Agency FY 1987 Budget.

We began the program with the objective of providing technical assistance to the rural water systems to help them in their efforts to meet the compliance requirements of the Federal Safe Drinking Water Act (SDWA). After the passage of the SDWA in 1974 initial EPA studies determined that the most difficult SDWA compliance problem would come from small systems with part-time operators and little or no training in water system operation and management. While 80% of the people in the United States are served by the large community water systems, the most serious drinking water problems occur in those 80% of the systems which serve only 20% of the people -- the rural people. As EPA through the state drinking water agencies began to contact these small systems to enforce the testing and water quality provisions of the Safe Drinking Water Act they found many systems with part-time, minimal, or no maintenance and, in general, a very defensive attitude toward EPA's intrusion into their business. In many states the Safe Drinking Water Act and the small rural water systems were headed toward a confrontation that nobody would win.

It is within this atmosphere that the NRWA rural water training and technical assistance program was created and has grown. The overriding thesis of the program is that the best way to improve the quality of the drinking water in rural areas is to improve the quality of water supply, the quality of water system operation, maintenance and management and to encourage a strong local commitment to charge the water rates needed to pay for a good quality water system. The objective of the NRWA program in each state has been to assist and guide local water system personnel and Boards of Directors to commit to a method of operation that will allow their systems to meet all the requirements of the Safe Drinking Water Act as well as prepare for having a strong and healthy rural water supply in the future. The way Utah and the other NRWA states have approached this objective is to have rural folks help rural systems to solve their own rural water system problems.

The program establishes a structure of assistance and support which allows state rural water systems, through their state associations, to assist all small systems. There are a minimum of twelve one-day training sessions held in different rural communities throughout the year. Each session covers basic information needed in the management and protection of water in any small system. In addition, the program manager in each state spends a minimum of ten days in the field working on-site with individual systems as a follow-up to the training sessions or in response to specific requests for assistance. Most states provide regular newsletters or magazines which highlight the information important to compliance with the SDWA and the operation of a system during different seasons of the year. Finally, the overall operation is guided by the state association board of directors which is comprised of rural water system representatives from every geographic region in the state.

The program is a solid grassroots program. It is folks working with folks where folks live and work. It is a program that is immediately responsive to resolving rural water system problems in a manner that is comfortable to the rural way of doing business. The program provides:

- border-to-border contact with all rural water systems in each state
- monthly or quarterly newsletters with down home advice as well as a very clear message on the priority for SDWA compliance
- immediate assistance for any small system expressing operation or management difficulties by contacting the state rural water association office
- unified rural water systems within a state to press for increased state and local participation in the funding and support for rural water systems which reduces demand on FmHA grants and loans
- access to all small water systems for EPA and state regulatory personnel to deliver the message and monitor the level of effort for SDWA compliance among rural water systems.

In short, the program delivers a simple, firm message to its peer participants - "rural water systems must take the steps necessary to protect the quality of their drinking water and be in compliance with the SDWA."

The number of participants in the one-day training sessions continues to increase as do the number of rural water systems actively participating in the overall state association program. For example, in the eleven months from April 1, 1985 through February 28, 1986, state associations conducted 366 workshops and provided training for 12,981 rural water operators representing 5,567 systems. With the constant turnover of small system operators the majority of these persons have never attended water-system training sessions. Over 7,796 technical assistance visits, including 1,230 for compliance with the Safe Drinking Water Act, were also carried out and were normally the only hands-on assistance provided to these systems to help them meet the requirements of the Safe Drinking Water Act. Attached are state-by-state breakouts of the workshop training sessions and technical assistance visits over the past eleven months.

We are here today not only to report to you on the effectiveness and success of the program, but to urge your support in expanding it from thirty-four to forty-one states for next year. This would increase the funding for the program to $3.0 million for FY 1987. This will enable NRWA to establish programs in those states where rural water systems have expressed an interest in developing their own statewide rural water training and technical assistance programs.

In addition, we want to point out that the Senate-House Conference recently approved the reauthorization of the Safe Drinking Water Act (S.124, HR 1650) which provides for a major increase in federal mandated requirements for water systems. The new law requires EPA to issue eighty-five new drinking water standards within the next three years, create new enforcement procedures for public water supplies, require mandatory treatment technology for small systems unless a variance is obtained, and require mandatory monitoring (ie increased sampling for small systems) by all systems of the EPA-generated contaminant list. In addition, civil penalties can now be assessed against small systems even if the failure to meet standards was not "willful". In short, the burden on rural water systems increases significantly. In Mississippi, for example, the cost for the required testing of a well for organic pollutants will increase from $500 to $1400.

The Conferees recognized both the major impact these new provisions will have on rural systems and the effectiveness of our rural water training and technical assistance program. The new Section 1442(g) of the Act specifically authorizes a $10 million small system technical assistance program and cites the NRWA program as an example of how an effective small system technical assistance program should be operated.

We believe that this is a solid endorsement of the NRWA grassroots training and technical assistance approach that this committee has supported over the past few years. We further believe that the EPA Drinking Water program has been one of the more effective federal environmental protection activities in rural areas because of its emphasis on the hands-on assistance approach as provided through our program.

We have been working with the Association of State Drinking Water Administrators (ASDWA) to consider the most effective way that the new small system technical assistance program could be utilized to solve SDWA compliance problems in rural areas. We believe that a program developed cooperatively between NRWA and ASDWA in each state would have the capability of helping rural water systems meet the increased requirements under the new law. Thus, we are requesting that the Committee appropriate the ten million dollars authorized in S. 124 in FY 87 so that this new program can begin at the same time that the new provisions in the Act are to be enforced. Otherwise the small water systems throughout the country will have severe problems in meeting the more complicated federal requirements of the reauthorized law.

Thank you and your Committee for its support in the past. We would appreciate greatly your assistance in continuing and expanding our rural water training and technical assistance program and in providing funding for the new small systems technical assistance provision in the recent reauthorization of the Safe Drinking Water Act.

FEB FY 86 (Eleven Months)

TECHNICAL ASSISTANCE
Y-T-D TOTALS
SDWA

		Systems	Potential								
	TA Days	Contacted	Comp	Operation	Maint	Manag	Finance	Solved	Referred	Informed	Other
Alabama	113	87	0	63	18	0	7	32	0	2	54
Arkansas	135	334	11	60	53	164	46	48	14	217	55
Colorado	110	277	7	108	23	115	24	129	0	142	6
Florida	108	267	63	131	27	35	10	26	11	76	34
Georgia	107	191	19	183	159	22	47	31	9	182	5
Illinois	121	282	0	164	94	16	8	32	29	221	0
Indiana	127	217	0	92	92	22	11	4	1	212	0
Iowa	114	253	16	110	27	95	9	127	1	112	13
Kansas	113	316	102	39	40	94	41	86	36	180	14
Kentucky	109	253	73	40	35	124	5	84	0	150	7
Louisiana	109	176	27	76	42	29	18	64	3	90	21
Maine	112	354	74	98	5	88	89	74	6	248	26
Minnesota	94	190	22	125	30	17	19	41	1	54	101
Mississippi	96	297	0	104	15	175	3	80	15	173	29
Missouri	108	262	10	84	20	106	37	128	6	107	20
Montana	132	292	56	103	54	111	17	129	4	160	11
Nebraska	119	403	90	361	23	48	28	121	1	296	8
New Mexico	108	374	53	159	127	158	50	106	9	237	71
New York	97	119	6	49	62	16	6	77	10	38	5
NCarolina	112	120	6	49	23	27	15	30	0	70	2
NDakota	104	395	74	218	130	152	61	85	109	229	115
Ohio	155	277	70	87	21	75	24	209	0	47	21
Oklahoma	117	194	5	89	0	98	2	36	1	118	39
Oregon	113	312	100	82	48	104	11	70	17	201	24
SCarolina	122	274	93	234	132	104	162	112	157	248	5
SDakota	112	239	26	63	81	64	34	106	3	139	23
Tennessee	111	199	78	59	23	111	31	88	3	99	10
Texas	105	111	25	14	7	59	6	14	1	84	12
Utah	112	218	63	82	81	72	29	75	4	120	23
Vermont	230	292	21	230	14	13	14	58	6	199	31
WVirginia	71	117	0	72	16	37	10	6	5	108	3
Wyoming	93	104	40	29	19	12	4	21	2	67	14
TOTALS	3689	7796	1230	3457	1541	2363	878	2329	464	4626	802

FEB FY '86 SDWA WORKSHOPS YEARLY (Eleven Months)

	Number Conducted	Number Attending	Number Systems	Regional EPA	FmHA	SDWA Personnel	Engineers	Suppliers	Contractr	Other
Alabama	11.00	806	257	1	19	14	35	145	1	334
Arkansas	12.00	562	306	1	11	11	9	95	0	10
Colorado	11.00	292	136	0	8	5	8	32	5	22
Florida	10.00	342	147	0	1	43	15	29	8	17
Georgia	11.00	404	165	0	6	11	12	41	1	9
Illinois	14.00	243	93	9	11	5	1	18	3	21
Indiana	13.00	183	68	0	11	12	7	26	2	0
Iowa	10.00	519	226	0	4	2	5	53	2	9
Kansas	12.00	511	219	4	16	30	18	44	4	35
Kentucky	11.00	608	234	0	4	1	34	69	20	38
Louisiana	10.00	408	312	1	3	30	1	50	6	5
Maine	11.00	298	106	0	0	11	0	10	4	10
Minnesota	10.00	203	123	0	0	3	0	19	0	15
Mississippi	9.00	290	82	0	1	0	14	80	12	35
Missouri	11.00	351	145	0	3	3	8	33	3	19
Montana	14.00	403	209	0	1	19	19	26	3	18
Nebraska	12.00	435	239	0	15	24	15	25	0	11
New Mexico	11.00	399	173	7	3	4	8	66	1	126
New York	11.00	735	398	1	1	34	20	29	0	11
NCarolina	9.00	290	135	0	0	19	10	9	0	0
NDakota	14.00	314	133	15	13	17	5	19	2	122
Ohio	6.00	199	65	0	3	2	9	17	0	9
Oklahoma	11.00	514	221	2	59	6	12	35	4	30
Oregon	11.00	218	104	0	4	7	7	30	4	4
SCarolina	14.00	259	130	0	6	6	23	12	0	2
SDakota	22.00	964	228	2	4	12	7	266	9	482
Tennessee	11.00	538	141	0	8	13	30	64	0	12
Texas	15.00	819	346	5	31	16	6	36	0	45
Utah	11.00	394	190	0	0	21	7	10	1	7
Vermont	11.00	175	98	2	1	5	2	6	6	7
WVirginia	7.00	143	53	0	7	4	2	22	2	1
Wyoming	10.00	162	85	1	0	0	4	0	0	4
TOTALS	366.00	12981	5567	51	254	390	353	1416	103	1470

STATEMENT OF VIC DIGERONIMO, PRESIDENT, INDEPENDENT EXCAVATING, INC. (OHIO), AND PRESIDENT-ELECT, NATIONAL UTILITY CONTRACTORS ASSOCIATION

ACCOMPANIED BY DAVID F. McDERMITT, DIRECTOR, GOVERNMENT RELATIONS

Senator LEAHY. Our next witness is Vic DiGeronimo.

Mr. McDERMITT. Mr. Chairman, my name is Dave McDermitt. I am director of government relations helping to assist in answering any questions.

Senator LEAHY. Thank you.

Mr. DIGERONIMO. Mr. Chairman and members of the committee, as president-elect of the National Utility Contractors Association [NUCA], I represent over 2,000 companies nationwide that specialize in wastewater treatment and water delivery system construction. Because many of the projects built by our members are financed through the EPA Construction Grants Program, I will take this opportunity to briefly summarize the construction industry's views on the program.

I first want to take a moment to thank the committee for assuring full-year funding for this program in recent years. The $2.4 billion appropriated by Congress annually in fiscal years 1982–85 brought much-needed funding stability to the program, enabling State officials to better administer their planning and construction work.

I also want to particularly thank Chairman Garn and Senator Leahy for their leadership in releasing $600 million in fiscal 1986 financing for the program. The failure of the Health Center Conference Committee to finalize program reauthorization language would have resulted in serious damage to the Clean Water Program in most States without this funding.

Unfortunately, that funding is being used up quickly, and some 20 States have now depleted their share of the $600 million.

The association respectfully urges this committee to expeditiously act to release the remainder of the $2.4 billion in fiscal 1986 funding at the appropriate time in order to, again, prevent disruptions in the program.

While there is no question that a compromise on the Clean Water Act amendments should already have been reached, we remain confident that a final agreement will be finalized in the coming weeks. On the question of program funding for fiscal year 1987, I must emphasize NUCA's staunch opposition to President Reagan's proposal calling for $1.8 billion in funding.

We also oppose his plan to limit funding to continue construction on ongoing projects only. The continuation of $2.4 billion in funding for the coming fiscal year is critical if the EPA construction program is to remain an effective tool in the Nation's water pollution control effort.

I offer to you the following points in support of our industry's position:

The current backlog of existing municipal wastewater treatment construction needs is estimated at $85 billion.

Three thousand projects necessary to meet the July 1, 1988, municipal enforcement deadline have not yet been funded, all of them new construction projects.

Reducing annual Federal funding would merely postpone necessary construction projects and ultimately increase the cost of future construction.

Despite these acknowledged needs, the survey by NUCA reveals that the administration's fiscal 1987 budget request for the major Federal programs that finance the construction of sewage treatment systems, including the EPA program, represents a staggering 64 percent reduction from congressional appropriations for these same programs in fiscal 1980.

Specifically, funding for these programs in 1980 totaled just under $5 billion, compared to the administration's 1987 request of $1.8 billion for these same programs.

In addition, pending tax reform proposals could worsen the problem by eliminating the ability of municipal governments to finance construction through local resources due to new restrictions on development bonds.

It is also important to note that the Clean Water Act amendments approved by both the House and the Senate call for a $2.4 billion authorization for the Construction Grants Program in fiscal 1987. An equal amount is assumed for the program in the budget resolution recently enacted by the Senate Budget Committee.

Mr. Chairman, as does any responsible business group, the National Utility Contractors Association supports a balanced Federal budget, but given the figures I cited earlier, indicating a potential 64-percent reduction in Federal funding for the major Federal sewage treatment construction programs, we feel very strongly that this area of the Federal budget has already been pared to the bone.

A sound wastewater treatment infrastructure is essential to future economic development in all areas of the country. Many communities are now under court-ordered construction bans due to a lack of sewage treatment facilities. The EPA Construction Grants Program is necessary, it is efficient, and above all, it is working.

I strongly urge you to support a $2.4 billion appropriation for the program in fiscal 1987, and I thank you for granting me the opportunity to appear before you today.

I will be happy to answer any questions you may have at this time. Thank you.

Senator LEAHY. Thank you. I appreciate your kind comments about the work Senator Garn and I have done to make this money available. When I go back to my own State of Vermont I hear from a lot of contractors up there that they don't see the money coming. If this impasse isn't resolved they are going to move on to other jobs. Of course, we deal in Vermont with an extremely short construction season because of the severe weather. I am concerned that if this waits much longer, we won't lose a month; we will lose a year if you try to put it all back on track later.

Now, the urgent supplemental has been slowed down, as we discussed earlier. Do you think it is drop-dead time? When do we have to act in order to prevent disruption in this program?

Mr. DIGERONIMO. As soon as possible. As I mentioned earlier, about 20 States have depleted their share of the $600 million that was first appropriated.

Senator LEAHY. We are really right up against it today. It is not a question of talking about the end of the summer or something. We are up against it today?

Mr. DIGERONIMO. Yes; but usually on an EPA job, from the time of bid to the time of award, is about 60 days. So if you were to bid a job today, it would be 60 days before you could get it started; before that they have to advertise for 30 days. So if you start today, you are 90 days away from actual construction. We always figure as contractors, on July 4, half the construction season is over in the Ohio area.

Senator LEAHY. You are probably right.

Mr. DIGERONIMO. So we are getting pretty close to that.

Senator LEAHY. Well, thank you. I appreciate the testimony, and I agree with it. Thank you very much.

Mr. DIGERONIMO. Thank you very much, sir.

[The statement follows:]

STATEMENT OF VIC DIGERONIMO, INDEPENDENCE EXCAVATING, INC., INDEPENDENCE, OH, AND PRESIDENT-ELECT, NATIONAL UTILITY CONTRACTORS ASSOCIATION

Mr. Chairman and members of the committee, the National Utility Contractors Association (NUCA) is comprised of 2,000 companies nationwide -- contractors, suppliers and manufacturers -- that specialize in wastewater treatment and water delivery construction projects. NUCA members lay the pipe and build the treatment plants necessary to achieve the goals set forth by Congress in the Federal Water Pollution Control Act. In short, it is our job to build the projects necessary to meet the "clean water" requirements mandated by Congress.

As a result of our experience in building many of the sewage treatment facilities financed by the funding appropriated by this committee for the EPA Construction Grants Program, I wish to take this opportunity to offer the underground construction industry's views on the program and to offer our recommendations on fiscal 1987 funding for it.

Past Appropriations

Before addressing myself to the question of fiscal 1987 appropriations for the program, I want to take a moment to thank you, Mr. Chairman, and each member of the committee for your outstanding leadership in recent years in ensuring full yearly funding for this crucial program. The $2.4 billion appropriated by Congress annually in fiscal years 1982 through 1985 brought much-needed funding stability to the program. State officials have been better able to administer their planning and construction knowing that a stable source of federal financing would likely be forthcoming on a yearly basis.

That steady flow of funding, coupled with the outstanding management of the program by Henry Longest, Acting Assistant Administrator for Water, and William Whittington, Director of the Office of Municipal Pollution Control, has resulted in a smooth running program over the past four years. More importantly, real progress has been made in the nation's ongoing battle against water pollution.

More recently, Chairman Garn and Senator Leahy are particularly responsible for winning Congressional approval for the release of $600 million in fiscal 1986 financing for the EPA construction program. The failure of House and Senate public works committees to finalize legislation reauthorizing the program would have undoubtedly resulted in serious disruptions in the clean water program in most states. The shutdown of projects already under construction and the postponement of new projects was prevented only by this panel's decision to include $2.4 billion in funding in the fiscal 1986 continuing resolution enacted in December. As you know, $600 million of this funding was made immediately available for construction, with the release of the remaining $1.8 billion contingent upon final enactment of the reauthorization bill.

Despite the tireless efforts of NUCA, program reauthorization language contained in the Clean Water Act Amendments has still not been resolved by the conference committee. As a result, this association respectfully requests that you include the release of an additional $600 million for the EPA program as part of the supplemental appropriations measure for the current fiscal year.

Some twenty (20) states will have depleted nearly all of their federal EPA financing for construction as of April 30. Key administrative personnel are now being laid off in several states. Planned projects ready to go to construction have been put on hold due to a lack of federal financing. In fact, part of the construction season will be lost in colder regions of the country, delaying construction on some projects for nearly a full year unless additional financing is soon forthcoming.

Chairman Garn, Senator Leahy, and members of the panel, once again we look to your leadership in releasing an additional $600 million of the remaining $1.8 billion in fiscal 1986 appropriations in order to prevent major disruptions in the program that are sure to occur in many states within the next few weeks. We further strongly encourage you to make every effort to take the necessary steps to release the remainder of the fiscal 1986 appropriation after final action on the reauthorization measure has been completed.

Fiscal 1987 Appropriations

In regard to the issue at hand -- fiscal 1987 funding for the EPA Construction Grants Program -- I must emphasize NUCA's staunch opposition to President Reagan's proposal calling for $1.8 billion in construction financing. A continuation of $2.4 billion in funding for the coming fiscal year is critical if the program is to remain an effective tool in the nation's water pollution abatement effort. I want to say at the outset that we, as underground utility contractors, have a vested interest in the program and would hope to benefit from this funding through the competitive bidding system. While there is no question that more of the funding burden must be assumed by state and local governments, a $2.4 billion appropriation for fiscal 1987 remains vitally important.

The problems confronting this nation's sewage treatment systems are acute, they are immediate and they are widespread across the nation. This dilemma is the result of long-term, massive under-investment in wastewater treatment systems, largely on the part of state and local governments. All told, the EPA estimates it will cost some $108 billion by the year 2000 in order for the nation's wastewater treatment systems to comply with current environmental requirements -- $85 billion alone for the current population. Under current law, the projected federal share of those costs has been reduced to roughly $35 billion. While we are aware of the perhaps somewhat inflated projections contained in the EPA survey, there is little doubt the financial requirements for the remainder of this century are immense.

We also wish to bring to your attention the April, 1983 report by the Congressional Budget Office (CBO) entitled, "Public Works Infrastructure: Policy Considerations for the 1980s" The report from this highly respected body states, " Inadequate sewer pipes and sewage treatment as well as insufficient capacity to handle storm runoff characterize many of the nation's 15,000 wastewater treatment systems ... but projected federal and non-federal outlays combined fall short of (projected needs) by about 24 percent."

The CBO report also indicates EPA and other federal agencies, under the appropriations ceilings now authorized, will spend an average of $3.2 billion on wastewater facilities each year between now and 1990. In order to meet all estimated needs, the CBO indicates federal spending would have to increase to an average of $4.2 billion each year through 1990 -- roughly a 25 percent increase.

Additional statistics also support the need to maintain funding for the construction grants program:

- The current backlog (total existing needs) for compliance with the Act is estimated at $85 billion, according to EPA;

- Billions in wastewater treatment projects ready for construction currently await funding;

- According to Pat Choate, co-author of "America in Ruins," it will cost $25 billion over the next few years alone to meet pollution control standards;

- Nearly one-half of the nation's communities are unable to add additional homes and businesses onto their sewage treatment systems because those systems are already operating at full capacity -- thereby losing valuable tax revenues.

It is this last statistic that is particularly alarming. A sound network of basic public facilities is essential to the future economic growth of our nation. Studies indicate businesses and industries place the condition of an area's sewer and water systems near the top of their list of criteria in determining whether to build, expand or relocate.

Perhaps the most convincing argument in favor of a $2.4 billion appropriation is to consider the risks involved in reducing current funding levels. Low annual expenditures postpone the nation's clean water problems and thus prolong the very need for the federal program. Studies indicate that between 1976 and 1984, construction costs in this nation increased by 65 percent. Any reduction in current funding will lead to delays in construction which, in turn, will add to the total cost of the program.

Again, we stress that State and local governments must also increase their financial commitment for water pollution control construction projects. This should be accomplished through a tough EPA enforcement policy requiring municipalities to develop a firm construction schedule to meet the water quality standards required by the federal Clean Water Act -- a policy that is currently being pursued by the EPA.

The need for a $2.4 billion appropriation can best be summarized by citing a report from state program administrators, which indicates that nearly 3,000 projects necessary to meet the July 1, 1988 municipal enforcement deadline have not yet been funded. The fact that all of these projects constitute "new starts" is also ample reason for the committee to reject the Administration's proposal to limit fiscal 1987 funding only to continue construction on projects already begun. The proposed ban on the funding of new projects has been rejected by the committee in the past, and NUCA urges you to again permit the use of any new appropriations for all projects, both new and ongoing.

Budgetary Considerations

NUCA's recommendation to maintain the current funding level is due largely to our firm belief in the critical link between adequate wastewater treatment facilities and future economic growth.

It is also a result of planned reductions in federal funding proposed by the Administration for this and other programs used by state and local governments to finance sewage treatment construction projects.

Despite the acknowledged construction needs cited earlier in my testimony, a survey by NUCA reveals that the Reagan Administration's fiscal 1987 budget request for the major federal programs that finance the construction of sewage treatment systems represents a staggering 64% reduction from Congressional appropriations for these programs in fiscal 1980. Specifically, the reduction is from $4.92 billion in 1980 to the proposed 1987 total of $1.8 billion in the President's budget request for these three programs. A breakdown of these figures follows:

FEDERAL WATER/WASTEWATER CONSTRUCTION SPENDING

Program	Fiscal 1980 Appropriations	Fiscal 1987 Request	Decrease
Farmers Home Administration (FmHA) Water/Waste Disposal Program (total grants & loans)	$990 million	-0-	$990 million (-100%)
Economic Development Administration (EDA)	$582 million	-0-	$582 million (-100%)
Environmental Protection Agency (EPA) Construction Grants	$3.4 billion	$1.8 billion	$1.6 billion (-47%)
TOTAL =	$4.972 billion	$1.8 billion	$3.172 billion (-64%)

Have state and local governments picked up the slack? Unfortunately not, as records indicate public construction as a percent of total construction volume is lower now than at anytime since 1947. Sharp drops in the public share of new construction in recent years have lowered the public share to 17.9% in 1984 -- far below the 30% share as recently as 1975. In fact, the total annual expenditure by the federal, state and local governments for public capital investment projects has declined by more than 50% in just the last 15 years.

In addition to cutting back federal appropriations for these programs, pending tax proposals would exacerbate the problem facing communities by limiting their ability to finance construction work through their local resources. Restrictions on municipal development bonds and other proposals expected to be an integral part of the final tax reform package would further hinder the opportunity for local communities to finance construction.

Pending Reauthorization Plan

The $1.8 billion White House budget proposal is in line with the Administration's 4-year plan to phase out all federal funding for this important environmental construction program. While a phase out of federal construction financing may indeed by desirable, the four year proposal offered by the Administration is simply too rapid if the sewage treatment program is to have any hope of continued effectiveness.

The House and Senate have already given careful consideration to the President's phaseout plan and have soundly rejected it. By overwhelming margins, both bodies approved similar pieces of legislation reauthorizing the EPA Construction Grants program for a 9-year period. Both bills would authorize federal funding of at least $2.4 billion annually through 1991 before phasing out all federal financing in fiscal 1994. While it is true that the House version calls for an increase of more than $2.4 billion in funding for 1987, we feel certain the conference committee will adopt the Senate language authorizing $2.4 billion in fiscal 1987.

An important provision of both the House and Senate measures would initially encourage -- and later require -- states to establish revolving loan programs to finance construction. NUCA fully supports this state revolving fund concept as an effective means of stretching the federal dollar, enabling many more planned projects to go to construction. The loan programs would also ensure state administrators of a steady and reliable source of financing that would aid in their planning and construction programs.

An increasing number of states are beginning to realize a program of federal grants is not interminable. Many have already established some type of program to finance needed construction projects. Many more states have legislation to establish such programs pending. All will agree, however, that an orderly federal phaseout, along with a dependable yearly level of federal financing, is essential if the federal clean water program is to remain effective. Reducing federal financing below a $2.4 billion annual level too rapidly will result in a breakdown in the clean water battle from which it would take years to recover.

Conclusion

Mr. Chairman and members of the committee, I conclude by imploring you to appropriate $2.4 billion in fiscal 1987 funding for the EPA Construction Grants Program -- an amount equal to that of recent years. This figure is both reasonable and responsible in light of the current need for this construction financing and the benefits derived from it.

As does any responsible business group, the National Utility Contractors Association (NUCA) supports a balanced federal budget. But given the figures cited earlier in my testimony, which indicate a 64% reduction in federal funding for the major federal wastewater treatment construction programs, we feel strongly that this area of the federal budget has already been pared to the bone.

Further reducing funding will not reduce the need for this financing, it will only postpone construction and lead to even greater costs and higher prices in the future. It is also important to note that a reduction in the federal budget deficit is partially dependent upon economic growth, and economic expansion is dependent upon a sound infrastructure. I also point out that $2.4 billion in funding for this program is "assumed" in the federal budget plan adopted by the Senate Budget Committee for fiscal 1987.

As the utility contractors of this nation, we stand ready and able to contribute to the twin goals inherent in this EPA program: environmental quality and economic growth. This program is important, it is efficient and, above all, it is working. I strongly urge you to continue your past support for the program in fiscal 1987 and beyond. Thank you for granting me the opportunity to appear before you here today, and I will be happy to answer any questions you may have at this time.

STATEMENT OF WILLLIAM T. ENGEL, DIRECTOR, SOUTH CAROLINA WATER QUALITY INSTITUTE, SUMTER AREA TECHNICAL COLLEGE, SOUTH CAROLINA

Senator LEAHY. Our next witness is witness is Dr. James L. Hudgins, the president, and William T. Engel, the director, of the South Carolina Water Quality Institute, Sumter Area Technical College.

It doesn't look like both Dr. Hudgins and Mr. Engel are here. You have got to be one or the other.

Mr. ENGEL. I am Dr. Engel from the Water Quality Institute. Dr. Hudgins is not able to be here today. He has asked me to give the testimony on behalf of both of us.

Senator LEAHY. We are delighted to have you here, and you go right ahead. Incidentally, one of the things I hoped you would go into is the fact that for several years, the Senate has added funds for sewage treatment operators training, something that in my own State I think is important. I offered an amendment funding this program 2 years ago. The administration hasn't requested these funds for many years, and I am just wondering if you have asked EPA to request these funds from the administration, and if you have, what was their response?

Mr. ENGEL. On behalf of the National Environmental Training Association, we have asked for funds, and have been granted funds through the 104(g)(1) program for the technical assistance program.

Senator LEAHY. You have.

Mr. ENGEL. That is what I was prepared to present today.

Senator LEAHY. Go ahead. Thank you.

Mr. ENGEL. We appreciate the opportunity to address the committee, and on behalf of Dr. Hudgins and the Sumter Area Technical College, it is a pleasure to be here.

We would like to, I guess, begin with some information and a little background on our particular training program at the Sumter Area Technical College. The Water Quality Institute is the designated State training center for South Carolina. It is located at Sumter Area Technical College. All training programs for water and wastewater operators originate from Sumter Area Technical College.

Full-time operators who have completed the training program complement a staff of two individuals at the training center. We work very closely with the regulatory agency in assessing training and technical assistance needs.

Since 1984, we have received $160,000 in Federal funds under section 104(g)(1) of Public Law 92-500. During this time, we have evaluated 35 wastewater facilities. A substantial number of these facilities have been brought into compliance, primarily because of the operator training and technical assistance program.

Overall, the program has improved compliance reporting, local financial management, reduced infiltration, inflow problems, energy and sludge handling costs. In the past 2½ years, 17 facilities have been brought into compliance and have remained in compliance.

We feel as though the improvements of the treatment plants have been very cost effective and the average cost per facility is estimated somewhere at $4,000 to $5,000. Initial construction costs the publicly owned treatment works somewhere between $1 and $6 million.

In terms of case studies specifically, Ridgeway, SC, located in Fairfield County outside of Columbia, has a 0.12 Mgal/d wastewater facility. This particular facility was brought into the program in March 1984 with the prime problems being lack of process control testing by the operators, improper reporting of data on the NPDS reports, no full-time operators at the plant, and lack of operations and maintenance at the plant.

As of September 1984, the plant is, and remains in, compliance. Financial management assistance training has helped the community secure a full-time operator, who now performs all the operations and maintenance, and also provided recommendations to implement a computer system to assist in the water and sewer billing program in Ridgeway.

Another community in South Carolina had periodic noncompliance and was diagnosed as having a financial management problem. During the record review process, the technical assistance team found that the community had been depositing money in several savings accounts for the past 20 years. These funds went unnoticed. The accounts showed $170,000 ham accumulated. As a result of the work that we had done and some of the advice that we have given them, the community has used part of the funds for operation and maintenance. A recommendation was made to invest the balance in long-term certificates of deposit.

We feel we produced some outstanding results with a very, very small Federal investment.

We are working the National Environmental Training Association [NETA] to development our State training action plan. This comprehensive plan is addressing long-term funding problems in all areas of environmental training and technical assistance in South Carolina. We are making progress for securing local support for training. This will eventually lead to financial self sufficiency.

At the present time, we feel it is premature to stop the funding program. Like many States, we need an orderly transition time to go to State and local funding.

As administered by EPA, this use of Federal funds is establishing the seeds of our program for training and technical assistance. We feel as though these efforts have been successful and should be continued through the fiscal year 1987 funding under section 104(g)(1) of the Public Law 92-500.

We appreciate this opportunity to provide the testimony on behalf of the environmental training profession, not only in South Carolina, but around the country, and we also support the earlier testimony of the National Environmental Training Association that was presented this morning by Andy Holtan, in which they were requesting the additional money to be added to 104(g)(1).

I would be happy to answer any questions at this time.

Senator LEAHY. I think the primary question is the one I had at the beginning, and you have answered that, Dr. Engel. I appreciate you being up here. I think you raised some good points before the committee.

Thank you, sir.

Mr. ENGEL. Thank you.

[The statement follows:]

STATEMENT OF DR. WILLIAM T. ENGEL, DIRECTOR, SOUTH CAROLINA WATER QUALITY INSTITUTE, SUMTER AREA TECHNICAL COLLEGE, SC

INTRODUCTION

This testimony is presented on behalf of the South Carolina Water Quality Institute at Sumter Area Technical College. It summarizes the current training and technical assistance programs and presents some recommendations for overall program direction.

The South Carolina Water Quality Institute is the designated 109(b) State training center for South Carolina. Located at Sumter Area Technical College, the programs originate from the central location. We provide training via the technical college network. Full-time operators who have completed train-the-trainer workshops complement a staff of two individuals at the training center.

As the training center, we work very closely with the regulatory agency in assessing training and technical assistance needs.

TRAINING AND TECHNICAL ASSISTANCE IN PUBLICLY OWNED TREATMENT WORKS [POTW's]

Since 1984, we have received $160,000 in Federal funds under section 104(g)(1) of Public Law 92–500. During this time we have evaluated 35 facilities. A substantial number of these facilities have been brought into compliance primarily because of on-site wastewater treatment plant operator training and technical assistance.

Overall, the program has improved compliance reporting and local financial management, reduced infiltration, inflow problems, and energy and sludge-handling costs. In the past 2½ years, 17 facilities have been brought into compliance and have remained in compliance.

The improvements are very cost effective in that the average cost per facility assisted is between $5,000 and $6,000. Initial construction costs on the POTW's range from $1 to $6 million.

Specifically, Ridgeway, SC, located in Fairfield County, has a 0.12 Mgal/d wastewater facility. The facility was brought into the program in March 1984. The prime problems were: Lack of process control testing by operators; improper reporting of data on NPDES reports; no full-time operator at the plant; and lack of operations and maintenance.

As of September 1984, the facility has been, and remains, in compliance.

Financial management assistance training has: Helped the community secure a full-time operator who now performs necessary operations and maintenance; and provided recommendations to implement a computer system to assist in the water and sewer billing program.

Another community which had periodic noncompliance was diagnosed as needing financial management assistance. During the record review process, the technical assistance team found that the community had been depositing money in several savings accounts for the past 20 years. These funds went unnoticed until this review occurred. The accounts showed $170,000 had accumulated. The community has used part of the funds found for operations and maintenance. A recommendation was made to invest the balance in long-term certificates of deposit.

We feel we have produced some outstanding results with a very small Federal investment.

There are approximately 18 facilities that have been referred to us which still have some compliance problems and training needs. Some facilities that the program has helped come into compliance still need to remain on the followup phase to maintain compliance.

We are working with the National Environmental Training Association to develop our State training action plan. This comprehensive plan is addressing long-term funding problems for all areas of environmental training and technical assistance. We are making progress in securing local support for training. This will eventually lead to financial self-sufficiency.

We feel that it is premature to stop funding the program at this time. South Carolina, like many States, needs an orderly transition time to go to State and local funding. As administered by EPA, this use of Federal funds is establishing the seeds of South Carolina's supporting a training and technical assistance program.

These efforts have been successful and should be continued through fiscal year 1987 funding under section 104(g)(1) of Public Law 92–500.

The South Carolina Water Quality Institute appreciates this opportunity to provide testimony on behalf of the environmental training profession.

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STATEMENT OF DR. WAYNE L. POPPE, PRESIDENT, NORTH AMERICAN LAKE MANAGEMENT SOCIETY

Senator LEAHY. Our next witness is Dr. Wayne L. Poppe.

Is it pronounced Pope or Poppe?

Mr. POPPE. Mr. Poppe.

Senator LEAHY. Poppe. I looked at it and it reads Poppe, and that is what I should have said. I'm sorry. You are the president of the North American Lake Management Society.

Go right ahead.

Incidentally, in your testimony, you state that the administration is zeroing out in 1987 essential EPA activities that could reverse this trend of water quality degradation. In your testimony, would you stress which activities you are referring to?

Mr. POPPE. Yes, sir; thank you.

Mr. Chairman, thank you for this opportunity to testify on the Clean Lakes Program, which is what we are speaking of. This year the administration is zero budgeting this program.

The Clean Lakes Program has been a very small and yet highly popular program. Our written testimony substantiates the program's effectiveness and your constituents have communicated the program's popularity to you.

We believe at this time the program should be base funded at $5 million. We also strongly suggest that when the Clean Water Act reauthorization process is complete, this committee reevaluate its position and support the program in a meaningful way.

The Clean Lakes Program is a good, decent, honest program that produces real results for the citizens of this Nation. It represents a good, hands-on program for controlling nonpoint sources, implementing watershed management, and works with the community to solve the common problem—making our waters clean again. That is all I have.

Thank you, Mr. Chairman. If you have any questions, I will be glad to answer them now.

Senator LEAHY. I must say Dr. Poppe, it has been 12 years listening to testimony, and it is great when somebody comes in not only within the time, but under the time. You have covered the essentials. It is one more example where we tend to be pennywise and pound foolish in holding back this money. I appreciate your testimony.

Mr. Poppe. Thank you, sir.

Senator LEAHY. Thank you, sir.

[The statement follows:]

STATEMENT OF WAYNE L. POPPE, PRESIDENT, NORTH AMERICAN LAKE MANAGEMENT SOCIETY

My name is Wayne L. Poppe and I am president of the North American Lake Management Society (NALMS), a national organization made up of citizens, scientists, lake associations, and water pollution control professionals who are concerned about poor water quality in our Nation's lakes and reservoirs.

For the last five years, NALMS has testified before this subcommittee in support of funding for EPA's Clean Lakes Program under section 314 of the Clean Water Act and for additional research on effectiveness of techniques for restoring and protecting lake quality. Last year we also stressed the need for funding a national program to control nonpoint pollution because nonpoint sources are the most significant contributors to lake pollution. This year we want to stress not only the need for funding section 314 and funding nonpoint pollution control efforts, but also that EPA and State programs are not achieving the needed restoration and protection of lakes and reservoirs and the situation is getting worse. A recent NALMS survey of State agencies found 10 times more degraded lakes in 1983 than in 1970, and the States reported impaired use in over 4,000 lakes and reservoirs because of pollution. In addition, the STEP project conducted by ASIWPCA found that 4 times more lake waters had degraded in quality than have improved in quality from 1972 to 1982 —— a total of 1.7 million acres of lake and reservoir waters were reported to be degraded over that decade. The EPA indicated in the 1984 National Water Quality Inventory that 52% of the lakes reported from 20 states suffer from nonpoint source pollution. The public is disappointed that this water pollution problem is getting worse despite the Clean Water Act and that the Administration's zeroing out in FY 1987 essential EPA activities that could reverse this trend of degradation and the economic and public health damage it causes.

The subcommittee is a trustee of America's waters; it is responsible for ensuring that public funds are spent wisely and that concrete improvements in water quality result from its appropriations. This subcommittee determines which programs receive funding and what the level of funding should be. Today, NALMS is asking you to begin reversing the trend toward dirty lakes and reservoirs in America. Today we would like to identify issues of concern in EPA and State activities relating to lake quality and we wish to provide recommendations for this Subcommittee to resolve these issues in the public interest.

SUMMARY OF NALMS RECOMMENDATIONS

- Level appropriations on the order of $15–30 million should be provided annually for 5 years for EPA's section 314 Clean Lakes Program to allow States time to develop their own self–supporting State lake programs. Phase I and Phase II projects should specifically be mentioned as being eligible.

- Appropriations of $15–20 million should be provided under section 106 for implementation of State nonpoint pollution control programs targeted to priority watersheds with impaired use caused by nonpoint sources. This action is recommended in anticipation of passage of the reauthorization of the Clean Water Act.

- The Committee report should require EPA to submit a report to Congress on the status and trend of lake quality, nationally. The nature and extent of pollution loading from point and nonpoint sources and resulting lake use impairment should be defined.

- The Committee report should require completion by December 31, 1987 of the lake restoration manual begun by EPA in 1984 with appropriations under section 104(h) of the Act and an accounting of the almost $4 million in research funding appropriated for the work leading to the manual. Additional research is needed to develop less expensive restoration and protection methods and to document effectiveness.

- At a minimum, 25 FTE should be provided in EPA's salaries and expenses appropriation to implement the recently completed Nonpoint Source Policy adopted by the EPA Administration.

- At a minimum, 3 additional FTE should be provided to implement the section 314 program and to promote adoption of effective lake restoration and protection programs by the States.

- NALMS supports appropriations under section 106 for implementation of State ground water protection programs in areas vulnerable to contamination.

OUR LAKES ARE BEING LOST

This subcommittee is aware that the lakes and impoundments of this Nation are vital not only for their ecological functions in supporting fish and wildlife but also for the economic basis —— measured in the billions of dollars —— to many local, State and National businesses. Unfortunately, our Nation is losing the battle to keep its lakes clean and the damage may be irreversible in many cases because of the high cost of cleanup. Two years ago we reported the results of a survey of State agencies we undertook for EPA on lake quality problems. About 10 times more problem lakes were found in 1983 than in 1971 and 40 times more lakes —— 12,000 —— were reported by the States to be suffering from nuisance growths of weeds and algae. More than 4,200 lakes were identified with impared use that adversely affects more than 4 million acres of lakes and impoundments. The NALMS survey found that we are also losing the battle against toxic substances. From 7 contaminated lakes 10 years ago, the 38 responding States now have 120 lakes contaminated with toxics. The States indicated that about 5,000 lakes were suffering from excessive levels of sediment. We provided specific examples of polluted lakes and reservoirs in States that many of you on this subcommittee represent.

The degraded condition of our Nation's lakes and reservoirs, especially the toxic contamination and potentially irreversible eutrophication problems, has the citizens very concerned and many of you have heard from your constituents about this problem. However, an even more alarming picture was painted by the results of the ASIWPCA STEP project released in 1984. In that EPA–funded survey of state water pollution control agencies, almost 2 million acres of lakes were reported to have degraded in quality in the decade since 1972. This is 4 times the amount that improved in quality in the decade since 1972 when the Amendments to the FWPCA were adopted by Congress. Because provisions of the Clean Water Act relating to lake protection and restoration are not adequately being implemented, lake and reservoir pollution is getting worse and this deserves the immediate attention of the subcommittee.

EPA PROPOSES NO FUNDING FOR THE CLEAN LAKES PROGRAM

In previous years we described how EPA's Clean Lakes Program under section 314 of the Act focused on implementing lake restoration and lake protection practices rather than just studying problems. Over 87 percent of the total funding has been devoted to implementation, while 7 percent was spent on diagnostic–feasibility surveys. The program is a high–yield, low cost water quality improvement program that has been effective in getting local, State, and Federal interests to cooperate in solving specific water quality problems. The program is voluntary and must be initiated by local or State interest. The 50–50 matching grant nature of implementation projects ensures active participation by requiring local and/or State investments in the project. An EPA audit of the costs and benefits of the Clean Lakes Program found it to be one of the more cost–effective government programs in existence. For every dollar expended by the Federal government, eight dollars in benefits were returned to the public. Unfortunately, since 1981 continuation of this program has been in jeopardy with budget reductions and efforts by EPA to redirect funding for section 314 to other programs. Last year, the struggle reached new heights as OMB pressured EPA to change guidance in mid–year in the hope that the program could be ended. The public is disappointed in these political maneuvers. Water quality continues to degrade. The result is that States are not adopting their own programs and in fact are closing lake programs down. Florida is a good example (with hundreds of degraded lakes) that once had a strong program. With mixed signals from Congress and EPA, Florida ended its lakes program; Maine, Wisconsin, and Washington had to struggle to keep their programs. The desperately needed local/State/Federal partnership for restoring and protecting lakes is being lost and the public is not being served.

This year, the Administration has asked for no funding for the Clean Lakes program. This is a tragedy! In the NALMS lake survey, the States reported a conservative immediate need for $150 million to address priority degraded lakes. The seriousness of the problem is recognized by the States but they clearly cannot handle it alone. They need substantial Federal guidance and financial incentives to develop their own programs. This situation is no different from the construction grants program and financing of municipal wastewater treatment. An adequately funded program is needed to bring the States up to speed in addressing such national pollution problems. Section 314 needs this level of funding if States are to develop restoration and protection programs for lakes.

EPA PROPOSES NO FUNDING FOR NONPOINT SOURCES CONTROL

Recent investigations have documented that nonpoint source pollution causes greater amounts of water quality damage in our Nation's waters than do point source discharges. The NALMS State Lake Survey found that nonpoint sources were the most significant cause of degraded water quality in lakes and reservoirs. EPA's Nonpoint Source Report to Congress indicated that lakes -- more so than other waterbodies -- were being degraded by nonpoint sources. Even the EPA-sponsored National Fisheries Survey found about 40 percent of the Nation's waters to be degraded by nonpoint sources while only 10 percent were degraded by point source discharges. EPA has recognized the problem, has indicated that it has sufficient authority in the Act to address nonpoint source pollution, and has prepared a National Nonpoint Source Policy for achieving abatement. Yet, the Administration has now proposed no funding for nonpoint source control and is only maintaining a small EPA staff working on this issue.

This is not a responsible action. Congress is currently appropriating billions of dollars to treat point source pollution under the construction grants, NPDES, pretreatment, and section 106 programs while point source pollution is only a very small part of the entire water quality problem facing our Nation. A significant staff in terms of FTE in Washington and the regional offices is needed by EPA to implement the National nonpoint pollution control policy. Action is needed not only on the part of State agencies in developing nonpoint control programs but also on the part of Federal agencies whose programs cause nonpoint pollution. Much planning was done under section 208 of the Act and many States now know where these nonpoint problems are. A special appropriation under section 106 is needed to give States incentive to develop nonpoint control programs in priority watersheds experiencing impaired use from nonpoint pollution. EPA should target this funding to States that do not now have the needed capabilities to accomplish this work as an incentive to develop the programs, especially for lake watersheds.

CONGRESS IS NOT GETTING NEEDED INFORMATION

The Congress is not getting the information needed to make necessary decisions on appropriations concerning polluted lakes. Groups that traditionally represent States' views on pollution control emphasize continued funds for construction grants. Wildlife groups concentrate on estuaries and trout streams. Even EPA is not telling Congress how bad lake pollution is. In EPA's Water Quality Report to Congress, submitted in February 1984, there was not one section devoted to lake pollution control or restoration needs. EPA has greatly downplayed the magnitude of damage caused by nonpoint sources to lake quality. We reviewed last year's 305 (b) Water Quality Report to Congress, and while the lakes and reservoirs section was improved, it still seemed to be understating the pollution problems facing lake resources and the restoration needs for achieving Clean Water Act goals. In fact, the report indicated that lakes are of good quality overall.

We are concerned about this information provided to Congress. It seems to be based on a small number of States and jurisdictions (30 out of 56) and only a portion of lakes and reservoirs were assessed. Some States only report on the few lakes they have sampled that year or have data on. For example, Minnesota has 3.4 million acres of lakes but only 17,000 acres have been assessed -- only .5 percent of Minnesota's lakes are included in the report. Others have high average cutoffs and do not report on smaller lakes (less than 200 acres) or only report on point source assessments related to lakes. It was clear from the EPA-funded STEP project that only a very small portion of lakes and reservoirs were adequately monitored to determine status and trends in quality and conditions related to eutrophication. This draft report does not even mention the section 314 Clean Lakes Program, but it provides highlighted "success stories" on 5 lakes where progress has been made. Unfortunately, each of these was a section 314 project, which provided the incentive for clean–up, yet no acknowledgement was made that section 314 was used in restoration.

We were so concerned about this situation that we asked several States what they thought of the report.

From Minnesota:

> After reviewing the 1984 U.S. Environmental Protection Agency (EPA) (Draft) 305(b) Report to Congress, I can state the report does not accurately depict the status of lake water quality in the state of Minnesota. The fact that the report is being used to represent the water quality of the nation and support some generalizations about the condition of the nation's lakes is alarming.
>
> The report overextends its applicability when it uses the information to support several broad generalizations as follows:
>
> > . . . the information presented does not support the statement 'the nation's lakes are of good overall quality.'"
> >
> > . . . the report identifies information provided by 19 state on 3,755 lakes which suggests 36 percent of the lakes are eutrophic; 48 percent were classified mesotrophic; and 14 percent classified as oligotrophic. Information from such a limited number of lakes must be looked at cautiously.
> >
> > . . . the report again uses a limited amount of data (nine states and 1,941,106 acres of lakes) to indicate that 'a high percentage of the nation's lake acres are of fishable and swimmable quality.'

From South Dakota:

> Concerning the "Lakes and Reservoirs" section of EPA's 1984 draft 305(b) Water Quality Report to Congress, it appears that EPA is using a limited amount of data to make generalized statements about the water quality of the Nation's lakes. Based on the information we have received, it is unclear whether South Dakota lakes are represented at all in this report.
>
> DWNR disputes the statement ' . . . the nation's lakes are of good overall quality, and may, in fact, be of slightly better quality than our rivers and streams.' Lakes usually trap a large portion of sediment, nutrients, and other pollutants entering them whereas rivers and streams receive constant flushing.
>
> The following statement is erroneous, 'This table (Lake Acres Meeting the Fishable/Swimmable Goal of the Clean Water Act) indicates that a high percentage of the nation's lake acres are of fishable and swimmable quality.' This statement is based on

> 1,941,101 acres. The State of Minnesota along has more unassessed acres than is reported assessed for the whole nation. Nothing more needs to be said about generalizing from such a small amount of data.

From New York:

> The present Administration at U.S. EPA has become quite optimistic in recent years, seeing the lake quality glass as half full as opposed to half empty. . . . The U.S. EPA 305(b) draft report you sent me seems to address water quality issues of the 1960's and 1970's and not the 1980's. Significant numbers of lakes in New York have water quality problems which limit best usage, and we presently have the resources to solve only a small few of just the high priority problems.

Congress cannot make well–informed decisions on funding if it is not receiving complete information. NALMS is concerned about the status of lake and reservoir quality in our Nation and that general reports such as 305(b) do not even include the ASIWPCA STEP report data on trends in water quality the last decade –– with 1.7 million acres of lakes degrading in quality over that 10 year period. This is not progress. This is a set–back for the entire nation. With the information that exists on billions of dollars of damage each year caused by nonpoint source pollution; with billions of Federal dollars being sent on treating point source problems; with point source pollution being only a small part of our Nation's water quality problems; and with the continued degradation of lakes, we recommend that EPA be directed to submit a separate report to Congress on status and trends in lake and reservoir quality. The report should include estimates of economic damage associated with the degraded lakes, nonpoint versus point source contributions of pollution, and an estimate of cost associated with restoring the degraded lakes. In fact, much of this information presently resides in EPA funded Phase I and II Clean Lakes Reports submitted at the end of each of these Clean Lakes Studies. There is a great deal of information that is available, but it does not seem to be reaching Congress.

RESEARCH FUNDING –– ECOREGION APPROACH

EPA's Office of Research and Development has been developing a concept called the Ecoregion Approach. The Ecoregion Approach is a way of identifying areas within a state or region that have similar water quality characteristics or spatial patterns. Many states and regions have diverse landforms with very different water quality characteristics such as coastal streams running through farmland in one part of the state and mountain streams in another part of the state. Existing water quality standards are nationwide values that do not recognize regionally variable water quality in our lakes and streams. This results in overly protective criteria in one area and inadequate criteria for other areas.

We would like to commend EPA for this research on Ecoregions and encourage them to continue working on regional water quality criteria. Realistic water quality standards and criteria that account for these regional differences will not only protect our lakes and streams but will also encourage economic progress.

GROUND WATER POLLUTION DEGRADES LAKES

Ground water is not an isolated resource. It is in dynamic equilibrium with streams, rivers, and lakes. Polluted ground water can affect water quality in rivers and lakes. During FY1985 Congress provided appropriations under section 106 for States to develop ground water protection strategies. While Statewide efforts are helpful, specific areawide protection programs are needed for specific aquifers or acres of States that are vulnerable to contamination. NALMS supports appropriations under section 106 targeted to specific ground water recharge areas for implementing protection programs.

SUMMARY

Our Nation's lakes and reservoirs have suffered terribly from pollution. Over 4,000 of them have been identified as having use impairments, and many more are now deteriorating. Over the last decade, the problem as identified by States has grown 10–fold and action on the part of Congress is urgently needed.

This tragedy can be traced to inadequate implementation of the Clean Water Act. EPA says that they have sufficient authority to resolve nonpoint pollution problems, yet they are not using the authority and they maintain only a small nonpoint source staff. There are mechanisms to deal with ground water protection in sections 102, 106, 208, 303, and 304 of the Clean Water Act, yet EPA does not use them. Section 314 can be used to restore and protect lakes and reservoirs, but the Administration has not proposed funding. This lack of implementation of key sections of the Act is destroying the local/State/Federal partnerships established in the 1970's that was to address lake pollution problems, and EPA is now losing its credibility with the public.

Americans clearly want and deserve clean lakes and reservoirs for safe drinking water, recreation, industrial use, and aesthetic enjoyment. More than half our Nation's population lives within 5 miles of a publicly owned lake! This subcommittee can reverse the worsening trend in pollution of our Nation's lakes by targeting funds to keep programs and by providing specific instructions on use of the funding to EPA. NALMS asks this subcommittee to make a commitment for clean water by supporting our recommendations for funding these key programs and we appreciate the opportunity to testify before you.

STATEMENT OF DR. B.J. COPELAND, CHAIRMAN, MARINE DIVISION, NATIONAL ASSOCIATION OF STATE UNIVERSITIES AND LAND-GRANT COLLEGES, AND THE SEA GRANT ASSOCIATION

ACCOMPANIED BY DR. JOHN L. KERMOND, ASSISTANT DIRECTOR, FEDERAL RELATIONS, MARINE DIVISION, NASULGC

Senator LEAHY. The next witness is John Simon, the president of the National Housing Conference, Inc.

Mr. COHEN. Senator, I am Carl Cohen, legislative counsel for the Legislative Housing Council. Mr. Simon, we believe, is in the area. He had plane trouble in New York. Could we be skipped over a people of times?

Senator LEAHY. Of course. If you would either let me or either of these gentlemen know when Mr. Simon gets here, we will just put him in.

Mr. COHEN. Thank you, sir.

Senator LEAHY. Thank you.

Then we will go to Dr. B.J. Copeland from North Carolina State University in Raleigh.

Senator LEAHY. Dr. Copeland, do you have John Kermond with you?

Mr. COPELAND. Yes, sir.

Senator LEAHY. You are Mr. Kermond?

Mr. COPELAND. Dr. Kermond; yes.

Senator LEAHY. Dr. Copeland and Dr. Kermond, on behalf of the Marine Division of National Association of State Universities and Land-grant Colleges. Actually coming from Vermont, when you hear somebody is here to testify on behalf of land-grant colleges, you perk up, pay attention, especially if you are at least an official descendant of Justin Morrill. So go right ahead.

Mr. COPELAND. Thank you, Mr. Chairman.

We do represent 149 colleges and universities in this country, as you know, and we serve as a large organization which awards a majority of graduate degrees awarded in this country. We have about 90 percent or so of the marine research and academic facilities within our universities. So we are speaking for a large segment of our community in this area.

I am here today, and I appreciate the opportunity to be here to make three points, and I will try to make those as brief as possible, since you have my written testimony already on file.

The first point that we want to make is about the EPA fiscal year 1987 proposed budget for research and development in the water quality area. As you know, Mr. Chairman, the management of our estuaries as valuable resources in this country is a formidible job. We don't believe it can be done unless there is adequate information coming along to help and undergear that management process.

We don't believe that the proposed reductions in the research budget is conducive to that kind of activity. So one of our points is that we need to, as you said just awhile ago, not be so pennywise and pound foolish, and that is, restore the research funds within EPA to support the fundamental research needed to manage our estuarine systems.

I might point out that since 1981, the research funds have been reduced from about $21 million now to about $6 or $7 million or in that area. We think that is a trend going in the wrong direction, and I don't believe that that is enough funding to maintain the breadth of research that we need to undergear that important area.

I might point out as an aside that the Great Lakes research in water quality is proposed to be reduced from $2.5 million down to $0.9 million, which raises a question about whether the United States can meet its responsibilities under the agreements of the International Joint Commission on Water Quality. We think it is a very serious matter, Mr. Chairman.

My second point is to emphasize to the committee and to emphasize to EPA, as well, that we believe that the management, whatever management activities, must be based on a very sound fundamental research basis.

And we also believe that that fundamental research can best be done in the creative halls of our academic institutions of this country. Just to help support that effort, we are currently, in the estuarine committee of the National Association of State University and Land-Grant Colleges, working closely with the Estuarine Research Federation to develop a more prioritized and more focused estuarine research plan.

The first report of that group is attached to my testimony as an appendix. I commend it to you for your look.

The third point is that one of the recommentations of the NASULGC committee is that the National Sea Grant College Program is used as a model for supporting or developing the means to get this research done. The Sea Grant College Program already has demonstrated its ability to bring together the effective partnership between the Federal Government, States, and the academic communities to address, focus, and prioritize the research. We would commend that to you for your consideration, as well, and a report from that group discussing those capabilities was also appended to the testimony.

So thank you very much. I have made my three points. I believe I have saved some time.

Senator LEAHY. Last year, as I understand it, we appropriated $2 million for comprehensive estuarine management. Would these funds be better used if they were switched to EPA's water pollution research and development account?

Mr. COPELAND. I don't know the answer to that question, because I think what you are getting to is, would they better be used if they supported also research? The answer to that is "Yes." However, that could be managed or programmed that would support that end, I would recommend that.

Senator LEAHY. OK; good enough. Thank you very, very much.

Mr. COPELAND. Thank you, sir.

[The statement follows:]

STATEMENT OF DR. B.J. COPELAND, UNIVERSITY OF NORTH CAROLINA, ON BEHALF OF THE NATIONAL ASSOCIATION OF STATE UNIVERSITIES AND LAND-GRANT COLLEGES AND THE SEA GRANT ASSOCIATION

Thank you and good afternoon. I am B.J. Copeland, Chairman of the NASULGC Marine Division Federal Relations Committee, Director of the North Carolina Sea Grant Program and Chairman of the Council of Sea Grant Directors.

I appreciate the opportunity to testify on the Environmental Protection Agency (EPA) budget request before this subcommittee on behalf of the Marine Division of the National Association of State Universities and Land-Grant Colleges (NASULGC) and the Sea Grant Association. The Marine Division of NASULGC is composed of 90 major U.S. marine research and education institutions which are committed to the understanding, conservation and development of the ocean and coastal environments. The Sea Grant Association consists of 40 colleges, universities, research centers, industries and consortia all dedicated to enhancing the nation's capability to develop, use and manage our marine resources. NASULGC is composed of 149 colleges and universities which award the majority of graduate degrees conferred in this country.

I wish to address the following items this afternoon:

1. The EPA FY87 budget relating to Research and Development.
2. The need for fundamental research in managing the nation's estuaries and coastal zone.
3. The unique capability for estuarine research in the National Sea Grant College Program.

I will close with a set of recommendations that the research capability of the Environmental Protection Agency be reaffirmed; that the management of the nation's estuaries be based on access to the best scientific and technical information available and be assured of a constant flow of new knowledge; and that the needed scientific and technical information is best provided by extramural research in the nation's universities and colleges. I have attached as appendices two reports on this subject prepared by the National Sea Grant College Program and the Marine Division of NASULGC.

Because estuaries serve numerous and varied constituencies, they are of enormous importance to society. But the multiple and conflicting uses of estuaries have stressed them. Therefore, it is not surprising that society has demanded that government direct its attention to protecting and when necessary rehabilitating these valuable natural resources. It also is not surprising that this attention has been directed to developing strategies to stop pollution and to enhance the aesthetic values of living resources of estuaries. The responses of our elected officials at all levels to citizens' demands for action in the estuarine programs, which have been responded to by our federal and state agencies responsible for protecting and managing our estuaries, have been laudable. One cannot argue with the intent.

But there is a problem; the programs have not worked very well. Our approach to estuarine management has been the development of large federal estuarine programs constructed as management programs to protect estuaries and to correct estuarine problems. These programs have been only marginally effective at improving our ability to manage because it is difficult to manage something you do not understand. Estuaries are the most complex and variable segment of the entire world ocean.

The management of estuaries is a formidable job. Those we charge with this enormous responsibility must be provided with access to the best scientific and technical information available, and must be assured of a constant flow of new knowledge. Management is a dynamic process--one which depends upon information. With greater knowledge, the limits on what is possible are extended and the likelihood of making appropriate and effective management decisions is increased. The understanding of the natural processes and their biological consequences, and the ability to separate these natural causes and effects from the effects of man, are needed before effective management strategies can be formulated.

We recognize, Mr. Chairman, that significant advances have been made in our understanding of how estuaries operate. But the level of ignorance remains unacceptably high, particularly for effective management. Until our knowledge of estuarine processes is increased substantially the uncertainty of which management strategies to apply and what results to expect will remain high. The only way to reduce uncertainty is to improve understanding through research--research at the most creative levels possible.

We are ever mindful, Mr. Chairman, of the current fiscal climate that we are all part of and of the need to reduce the national deficit. In spite of this austere fiscal climate, however, it is important to remember that research is an essential part of the work of EPA as a management agency. Research programs provide the scientific basis for EPA's regulatory activities, and they are essential to EPA's mission since no other agency of government supports this type of research. We note that R&D in the EPA proposed FY87 budget is scheduled for a 9.1 percent reduction in current dollars. It is even more alarming to notice that the research and development for water quality is proposed to be reduced by 15 percent from the FY86 estimate. This will reduce the agency's capability of funding fundamental research needed to manage this pervasive problem. The proposals are out of synchrony with the current emphasis on fundamental research by the administration. It is important that EPA have a viable program designed to provide the information necessary for effective management.

A reduction of $5 million is shown in exploratory research. This would result in a real reduction in competitive grants, which is the area in which the nation's best academic scientists are funded for research. This has the probability of the greatest impact. It should be noted that the intramural and extramural research components are closely related and managed jointly, which confuses the analysis of the actual proposed budget. Since salaries and expenses are treated as part of the research and development line, it is possible that the percent reduction for research in the proposed budget could be even greater than it appears. If we combine the cuts in EPA research support with the proposed NOAA cuts, the impact is drastic indeed.

The Great Lakes research in water quality is proposed to be reduced from $2.5 to $0.9 million, a drastic decrease. This reduction raises questions as to the agency's ability to meet its responsibilities under the agreements of the International Joint Commission on Great Lakes Water Quality.

There is a distinct need for basic research and for comparative studies of estuaries so that better and clearer generalizations can be derived and more effective generic management strategies developed. Without these generalizations it will be impossible to extrapolate with confidence what is learned in one estuary to another and to produce effective generic management guidelines. National and international coordination and collaboration of studies of different estuaries and the management problems and strategies associated with these estuaries could be of enormous benefit. There is an unusual opportunity for federal leadership in the support and coordination of such activities. The opportunity continues to be largely ignored and, with the proposed reductions in EPA's research budget, this trend is likely to continue.

Currently the Estuarine Committee of the Marine Division of NASULGC is taking a lead role in collaboration with the Estuarine Research Federation (ERF) to form a working group of leading estuarine scientists, managers, federal agency representatives and congressional staff members to identify research priorities for the nation's estuaries. This will be an ongoing activity. The emphasis will focus on identifying areas of fundamental research responsive to management needs and on research to provide the information required for the development of more effective management strategies. Through these active partnerships of scientists, managers and agency representatives, we hope to forge new linkages and greater trust among the different groups, each of which have a unique and vital role to play in a national estuarine program. The first report of this effort is attached as Appendix A.

One of the recommendations of the NASULGC report is that the National Sea Grant College Program could serve as the lead organization for a national estuarine research program. The National Sea Grant Colleges are the most effective existing mechanism for forging partnerships among the federal government, the states and the academic community. The Sea Grant Program also is a major source of support for basic research in the nation's estuaries. The program should be utilized in the design and conduct of comprehensive federal estuarine programs.

We are currently working with NOAA on a strategy for estuarine research in that agency. As the major academic group in NOAA research, we can also work with EPA as this strategy unfolds. While NOAA research is clearly of a fundamental nature, the EPA-supported research is more supportive of its management mandates. Examples of research conducted by the National Sea Grant College Program includes an understanding of water management currently being used to manage estuaries in North Carolina, Florida, Texas and California. We are currently involved in research on the problem of toxics in the estuarine environment, which has tremendous implications for the Great Lakes and estuaries in general.

Recently the National Sea Grant College Program prepared a capabilities report for estuarine research. Involvement of many of the nation's best estuarine scientists has been made possible through the Sea Grant College network. A copy of their report is attached as Appendix B.

Mr. Chairman, we have concluded that it is critical to the well being of this nation's important estuarine sector that fundamental research in EPA be continued, developed and enhanced. Therefore, we recommend:

1. That this subcommittee restore the funds necessary for the development of an effective fundamental research activity within the Environmental Protection Agency, particularly as it relates to the support of extramural research where fundamental and innovative breakthroughs can occur.

2. That the Congress reaffirm the need for fundamental research in support of management, and provide the necessary resources of support for this basic need.

3. That a partnership be developed among the scientists, managers, and agency representatives along with the oversight from Congress to better plan a national research program in support of the management of our nation's estuaries.

4. That the model that has been so successfully demonstrated by the National Sea Grant College Program be utilized to assist this nation in a more effective management of these valuable marine resources.

We thank you for this opportunity to testify. We look forward to working with you and relevant agencies to develop an effective program. If we can be of further assistance to the committee, please do not hesitate to call upon us.

ON THE IMPORTANCE OF ESTAURINE RESEARCH

A REPORT OF THE ESTAURINE COMMITTEE, MARINE DIVISION, NATIONAL ASSOCIATION OF STATE UNIVERSITIES AND LAND GRANT COLLEGES

Background

It has been predicted that within ten years 75 percent of the entire population of the United States will live within 50 miles of the ocean and the Great Lakes. Most of the areas of greatest population density will be near our estuaries. These large numbers of people make intensive, varied and often conflicting uses of estuaries; uses which in many estuaries already have resulted in degraded environmental quality and have contributed to substantial reductions in living marine resources. Many of our major cities in the estuarine zone were established by colonists as early settlements. Historical accounts of two-to-three hundred years ago invariably praise the clarity of estuarine waters and the bounty of the living resources found by those settlers who had left crowded and polluted cities bordering European estuaries.

Because of the enormous importance of estuaries to society resulting from the numerous and varied constituencies they serve, and because of the stressed nature of many of them resulting from these multiple and conflicting uses, it is not surprising that society has demanded that government direct its attention at protecting and, when necessary, at rehabilitating these valuable natural resources. It also is not surprising that this attention has been directed at developing strategies to stop pollution and to enhance the aesthetic values and living resources of estuaries. The responses of our elected officials at all levels to citizens' demands for action and the estuarine programs which have been generated by our federal and state agencies responsible for protecting and managing our estuaries have been laudable. One can not argue with their intent. But there is a problem. The programs have not worked; at least not very well. H.L. Mencken once observed that every human situation has a simple solution; neat, plausible and wrong. He was right; at least as far as our approaches to estuarine management are concerned. The large federal estuarine programs have been constructed as management programs; programs to protect estuaries and to correct estuarine problems. But, the programs have been only marginally effective in improving our ability to manage estuaries. It is difficult to manage something you do not understand.

Estuaries not only are the most important and valuable segments of the world ocean on an areal basis, they also are the most complex and variable segment of the entire world ocean. A recent report from the United Kingdom (National Environment Research Council, 1983)[1] describes estuaries as "... the most accessible part of the marine environment for the oceanographer and for commerce and recreation, yet conceptually, estuaries probably are the most recalcitrant; and technically are as exacting as the deep ocean." Surely estuaries are recalcitrant — resisting authority or control, not obedient or compliant — but they are not outside the realm of rational management.

The management of estuaries is a formidable job. Those who we charge with this enormous responsibility must be provided with access to the best scientific and technical information available at any given time and must be assured of a constant flow of new knowledge. Management is a dynamic process; one which depends upon information. Management, like politics, is the art of the possible. With greater knowledge, the limits on what is possible are extended and the likelihood of making appropriate and effective management decisions is increased.

Important characteristic properties which change on time scales of hours in estuaries change by comparable amounts only over periods of years, decades, and even centuries in the open ocean. And spatially, changes of these same properties which in estuaries occur over distances of a few meters in the vertical and a few kilometers in the horizontal in the open ocean occur only over distances of tens to hundreds of meters in the vertical and thousands to tens of thousands of kilometers in the horizontal. There are further complications in estuaries. In many estuaries man has compounded and confounded to a significant degree the already complex interactions of natural processes. Human activities have modified some of the natural processes in many estuaries in ways and to degrees that are wrought in the open ocean only over geologic time spans. Understanding of the natural processes and their biological consequences and the ability to separate these natural causes and effects from the effects of man are needed before effective management strategies can be formulated.

While significant advances have been made in our understanding of how estuaries operate, the level of ignorance remains unacceptably high, particularly for effective management. Until our knowledge of estuarine processes is increased substantially, the uncertainty of which management strategies to apply and what results to expect from a given strategy, or combination of strategies, will remain high. The only way to reduce uncertainty is to improve understanding through research; research at the most creative levels possible.

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[1] Natural Environment Research Council, 1983. Research on Estuarine Processes. Report of a Multidisciplinary Workshop held at the University of East Anglia, 14–17 September 1982,, 31 p.

At present, surprisingly little attention is being directed at research in the nation's estuaries. Large amounts of money are being spent on estuarine programs, but little of it goes to research and of that which does, little is for competitive research that could lead to major breakthroughs in our understanding of estuarine processes and problems. Not only do the existing large federal estuarine programs provide little direct support for research, often they impede the efforts of academic scientists to secure research support from other agencies. The price tags for these programs are large and the popular perception is that estuarine research funds are plentiful and that academic scientists should work within and through these coordinated estuarine programs. In practice, present programs provide little opportunity for academic scientists to do research on important fundamental questions which they select and formulate. Academic scientists are largely excluded from partnership in the design and execution of these programs.

Unless a major research program is initiated and sustained to support basic research on estuarine processes, there will be little opportunity for development of major, new innovative management strategies. In efforts to ensure that the public's money is not wasted, safe research and monitoring programs typically have been designed: programs whose chances of success are high, but programs which, at best will lead to incremental improvements in understanding and in management. It is unlikely that these incremental improvements will significantly advance our ability to formulate cost effective strategies to conserve, and when necessary to rehabilitate, estuaries. The advances in knowledge may not even allow us to keep pace with increasing stresses and degradation resulting from society's ever increasing demands on estuaries.

A basic research program might be funded as a special Congressional initiative or by allocating at least a modest percentage of estuarine budgets of those federal agencies charged with management and protection of the nation's estuaries for a competitive basic research program. Most of these funds could be designated for research on themes known to be of major management importance in a number of estuaries, but specific problem selection, problem definition and problem formulation should be left to the experts — the scientists. Only in this way can we attract the most creative scientists to direct their attention to the exciting and demanding problems in estuaries, and only through such research can we expect to see major advances in our understanding of estuaries and in our ability to manage them effectively.

There is a distinct need for basic research and for comparative studies of estuaries so that better and clearer generalizations can be derived, and more effective generic management strategies developed. Without these generalizations it will be impossible to extrapolate with confidence what is learned in one estuary to another, and to produce effective generic management guidelines. National and international coordination and collaboration of studies of different estuaries and the management problems and strategies associated with these estuaries could be of enormous benefit. There is an unusual opportunity for federal leadership in the support and coordination of such activities. The opportunity continues to be largely ignored.

In 1986 the Estuarine Committee of the Marine Division of the National Association of the State Universities and Land Grant Colleges (NASULGC) will take a lead role in collaboration with the Estuarine Research Federation (ERF) to form a working group of leading estuarine scientists, managers, federal agency representatives, and at least one Congressional staff member to identify research priorities for the nation's estuaries. This will be an on-going activity. The emphasis will be focused on identifying areas of fundamental research responsive to management needs: research to provide the information required for development of more effective management strategies. Through these active partnerships of scientists, managers and agency representatives we hope to forge new linkages and greater trust among the different groups, each of which has a unique and vital role to play in a national estuarine program.

Conclusions and Recommendations

- The present level of understanding of estuarine processes and of how society has affected those processes is not adequate for the development of effective management strategies for the nation's estuaries.
- So long as estuaries are important to society and are used for multiple and sometimes conflicting activites, we will need to study them. With proper design many of the persistent questions of major management importance are tractable if posed properly. With improved understanding, improved — more effective — management can follow. But, the need to study estuaries shall remain. While their specific problems and ailments may change, problems will persist and demand attention.
- Surprisingly little basic research is being done on estuarine processes and problems. Little support is available from the federal government or from other funding sources. The total level of support for basic research in all of the nation's estuaries from all sources is less than $15 million per year.
- The generation of new knowledge and the ability to apply it are closely coupled. New knowledge will come only through research.
- Management programs should be designed to make best use of available information and to retain flexibility to permit adaptation to evolving knowledge and technology. Major capital investments to enhance environmental quality should be phased-in to take full

advantage of emerging technology and increased understanding.

- Academic scientists should be involved from the outset in the design and execution of large, federally-funded estuarine programs. It is during the initial formulative stages when management objectives and information needs are translated into scientific and technical programs that the limits are set on what can be achieved through these programs.
- Colleges and universities with coastal laboratories should be encouraged to play major roles as partners with states and the federal government in research and monitoring of estuaries. Academic institutions can provide expertise at low cost, and can ensure a continued match between expertise and changing needs and opportunities.
- The National Sea Grant Program is the most effective of existing mechanisms for forging partnerships among the federal government, the states and the academic community. The Sea Grant Program also is the major source of support for basic research in the nation's estuaries. It should be exploited in the design and conduct of comprehensive federal estuarine programs.
- Mechanisms need to be developed to shorten the time between scientific advances in our understanding of estuaries and the incorporation of that knowledge into management policies and practices. Partnerships need to be forged between management and the research community to ensure a continual two-way flow of information. As in any partnership, effective communication is the key to sustained success.
- More support needs to be provided specifically for fundamental research on estuarine processes and problems. This support might come through a new Congressional initiative or through designation of some fraction of existing programs for this purpose.
- Support for competitive basic research could be targeted to a number of important themes critical to estuarine management — problems which cut across a number of estuaries.

Examples include:

(1) anoxia/hypoxia
(2) habitat alterations and their impacts on fisheries
(3) fine particle sediment systems
(4) ecosystem structure and function
(5) circulation and mixing
(6) influences of water flow management on estuaries
(7) estuarine responses to nutrient enrichment
(8) new technologies for resolving estuarine processes and problems.

- The ability to manage estuaries for maximum benefit to society is limited by knowledge. The only way to increase knowledge is through fundamental research.

Marine Division's Estuarine Committee

J.R. Schubel (Chairman), Marine Sciences Research Center, State University of New York at Stony Brook
James Alberts, Marine Institute, University of Georgia
B.J. Copeland, University of North Carolina, Sea Grant Program
Marsha L. Landolt, School of Fisheries, University of Washington
Ian Morris, Center for Environmental and Estuarine Studies, University of Maryland
V.T. Neal, School of Oceanography, Oregon State University
Scott Nixon, Graduate School of Oceanography, University of Rhode Island
Frank Perkins, Virginia Institute for Marine Science, College of William and Mary
D.W. Pritchard, Marine Sciences Research Center, State University of New York at Stony Brook
David M. Ross, Woods Hole Oceanographic Institution
Jonathan H. Sharp, College of Marine Studies, University of Delaware
John Vernberg, Baruch Institute of Marine Biology and Coastal Research, University of South Carolina

For Further Information Contact:

Estuarine Committee
J.R. Schubel,
Stony Brook, NY
(516)246-6543

National Association of State and Land Grant Colleges
John Kermond,
Washington, DC
(202)293-7120

SEA GRANT: A CAPABILITY FOR ESTUARINE RESEARCH

Congress established the National Sea Grant Program in 1966 to accelerate the development, use and conservation of the Nation's marine resources. During its nearly 20 year history Sea Grant has forged an effective partnership with universities, marine industries and governments. The research skills of university scientists from all fields — oceanography, engineering, law, economics, sociology — are combined with a strong commitment to make research findings available to a wide audience through a network of advisory and education specialists. Technical, advisory and public information reports, conferences, workshops and personal contacts by Sea Grant marine agents and university researchers ensure that information needed to use and develop marine resources reaches those who need it.

This experience, coupled with the partnership nature of the program, gives Sea Grant a unique perspective on current and future national needs in marine resource development. This paper is one of a series, each describing an issue of national importance, Sea Grant's contribution to tackling that problem, and priorities for future research.

Estuaries are flooded river valleys along the ocean and Great Lake shores of the United States.

They form buffer zones between the land and the ocean or lake, and they serve many vital functions. They are "nursery" areas for many of the important animals that constitute our nation's fisheries. As a mixing zone, they bring nutrients and vitamins from the land to the marine organisms of the sea. As buffer zones, estuaries block the dispersion of pollutants from the land into the ocean or Great Lakes. Aesthetically, they offer attractive sites for marinas, homes and recreation. As protected embayments, they often are the site of major ports and heavy industry and are important to national defense.

Estuaries in the United States vary in type and occurrence. They range from the *steep* estuaries along the glaciated coast of Alaska to the *abundant* estuaries along the subsiding coast of the eastern United States. The estuaries of the Mississippi delta are extensive, but those along the steep, tectonically active coast of California are small and sparse. Extensive flooded stream valleys characterize the southeastern United States, while along the Great Lakes it's wetlands, swamps and embayments. The knowledge to manage this varied habitat is based upon a sound research program.

Most commercially and recreationally important species (for example, shrimp, the single most valuable species) are absolutely dependent upon estuaries for at least a portion of their life cycle. In the southeastern U.S., 95 percent of all fish and shellfish species taken by commercial and recreational fishermen live in the estuaries for at least part of their lives. Nationwide, the figure is 70 percent. It is obviously important, then, to effectively manage these habitats to maintain fishery production and the accompanying employment and income it generates. But to maintain fisheries production we must learn how to make human activities compatible with the preservation of estuarine habitats. Within 10 years, 75 percent of the nation's population will live within 50 miles of the ocean or Great Lakes shores, and will impact the estuaries with every drop of water they take from or discharge into estuarine watersheds.

National Needs and Opportunities

The National Sea Grant Program conducts research in the nation's estuaries through a network of Sea Grant universities. To focus its research and develop a national program, the network has identified the following needs:

- To describe the relationships between physical and chemical variables and the productivity of estuarine ecosystems.
- To understand chemical and biochemical processes in the estuarine environment as they are affected by the introduction of foreign substances, especially pathogenic materials and toxic chemicals.
- To determine the impact of man's activities on the fundamental functioning of estuarine ecosystems.
- To develop appropriate measures for ameliorating undesirable effects and to reclaim damaged estuarine ecosystems.
- To develop the means to increase the harvest of fisheries products.
- To improve the economic return of land around the estuaries by resolving the conflict between land-use changes and estuarine productivity.
- To determine the optimal stream flows into estuaries that will maintain native populations and ecosystem functions.

Current Sea Grant Research Program

The National Sea Grant College Program devotes almost 20 percent of its research expenditures to studies of the nation's estuaries. Ongoing work includes landmark studies such as the following:

- The relationship of estuarine habitat to production of the highly-valuable fisheries of the northwest United States.
- Water quality and its impact on Great Lakes fisheries.
- Aesthetic and socioeconomic role of estuaries in the overall coastal economy of the Great Lakes and the southeastern United States.
- Interrelationship of land use in the watershed and the ecological stability of estuarine habitat on the east coast of the U.S.
- Development of guidelines for restoring degraded wetlands of California.

In recognition of the urgent importance of estuaries to the nation's well-being and economic development, the National Oceanic and Atmospheric Administration (NOAA) has recently designated an office for estuarine research coordination. The Sea Grant College network represents the most focused and organized research effort to address emerging management needs. These are some notable examples of how Sea Grant research has provided results to meet these management needs:

- Studies of the fate of nutrients in estuarine systems have provided the information necessary to formulate regulations regarding nutrient control in industry, waste treatment and land run-off.
- Shellfish beds have been opened for commercial harvesting because of reducted organic contamination and better understanding of pathogens in shellfish.
- Better management practices in agriculture and urban development have improved wetland water quality. Examples include the re-direction of water flows in the Everglades and Louisiana deltas, the Texas and California water plans, the Alaska pipeline, North Carolina agricultural practices, the Great Lakes international agreement and waste flow management in the northeast.
- Yields in some fisheries in the southeast have increased because of changes in harvest rates and timing of harvests, made because of better understanding of habitat requirements.
- Shoreline developers have had increased economic return because of better waste disposal techniques for individual homes.
- Sedimentation has been decreased, habitat enhanced and shoreline stabilization increased through techniques for transplanting marsh vegetation, mangroves and submerged aquatic vegetation developed in California, North Carolina, Florida, Washington and Mississippi.
- Combined scientific, engineering, economic and social science research has led to the integration of estuarine management into coastal zone management programs in states including Rhode Island, North Carolina, Florida and California.
- Coastal development in southern California has benefitted from methods of creating and enhancing wetlands that mitigate habitat losses.

Research Needs and Opportunities

Multidisciplinary and interrelated approaches are necessary to solve problems in critical areas affecting the nation's estuaries. Through a major workshop, organized by the Sea Grant universities, five critical areas of needed research were identified. These five areas are:

- Water management and its relationship to estuarine productivity.
- Sediment management and estuarine productivity.
- Nutrient inputs and other contaminants and control of primary productivity.
- Coupling of primary and secondary production.
- Habitat requirements for fisheries production.

Water Management And Estuarine Productivity

An important problem facing our nation today is the allocation of freshwater resources. As municipal, commercial, industrial, agricultural and recreational demands for water increase, the availability of water to downstream estuaries decreases. Changing land uses around estuaries and near the upstream tributaries affect the quantity, quality and timing of freshwater inflows. Since by definition estuaries involve the inflow and mixing of fresh water and salt water, any variations can cause significant changes in estuarine productivity. The interrelationship between freshwater inflow and primary/secondary production in the estuaries poses a prime research question. We need to know the quantitative relationship between freshwater inflow and fisheries production in specific estuaries and regional groups of estuaries. And we need to determine how much freshwater inflow is too much or too little on a seasonal or annual basis.

Sediment Management and Estuarine Productivity

Sediment quantity and quality can affect estuarine productivity. And man's activities in the watershed affect sediment processes, such as rates of accumulation and contaminant absorption. To better manage sediment processes, researchers need to examine the rates of accumulation and the changes in sediment composition between where it enters the estuary and where it accumulates. Scientists also need to better describe the processes that control the movement, absorption and desorption of contaminants. The capability should also be developed to predict the relationship between sediment accumulation and habitat type for a range of environmental conditions.

Nutrients and Other Contaminants and Estuarine Productivity

Observations indicate nutrient problems in estuaries are increasing. More people are living near our nation's estuaries. The resulting increased use of inorganic fertilizers and conversion of wetlands to urban and agricultural use eliminates the estuary's ability to act as a nutrient and sediment sink, thereby increasing estuarine nutrient levels. We do not yet understand the multiple relationships between nutrient inputs, recycling and production, and research is needed to test how an estuarine ecosystem responds to combinations of nutrient inputs and recycling. Scientists also need to study the ultimate fate of a host of synthetic chemicals and metals found in the estuary.

Estuarine ecosystems are characterized by high levels of primary and secondary productivity. The connection between high primary production and high secondary production is uncertain, and the question of the importance and ecological efficiencies of individual food chain pathways remains unresolved. Food chains in estuarine ecosystems are connected quantitively and qualitatively, and it is the goal of research to understand the relationship between the quantity of biomass at one producer level and the quantity and quality of biomass at the next level. For example, while a large biomass of blue-green algae is produced in some estuaries, no secondary consumers feed on this poor-quality algae.

Habitat Requirements for Fisheries Production

An estuary's primary role traditionally has been seen as that of a nursery for commerically and recreationally important fish species. However, it has been observed that some estuaries produce more fish than others. Understanding the role that estuarine habitat plays in the quantity of fish produced will provide the key to more effective fisheries management.

To find out what makes one estuary more productive than another, scientists must address questions about habitat selection, species migration, species residence times, food availability, circulation and exchange patterns, habitat quality and the effects of environmental variations on survival, growth and movement of fish and shellfish. Answers will help resource managers establish criteria to protect the estuarine characteristics that provide suitable fisheries production. And scientists may provide answers to the critical question of whether improved and enlarged nursery habitat will improve and enlarge fisheries production in our nation's estuaries.

STATEMENT OF JOHN F. WELCH, PRESIDENT, SAFE BUILDINGS ALLIANCE

Senator LEAHY. Because of a couple of witnesses not being here, we are running a bit ahead of schedule. I wonder, is Mr. Welch, the president of the Safe Buildings Alliance, is he here?

Mr. WELCH. The timing is impeccably good.

Senator LEAHY. Good. You just came in the door. And somebody will let us know if Mr. Simon arrives.

Mr. COHEN. We are on the phone, Senator, trying to make sure the plane is coming.

Senator LEAHY. I have had so many times when my plane has been hung up here.

Mr. Welch, go ahead, sir.

Mr. WELCH. Thank you very much, Senator.

My name is John Welch, president of the Safe Buildings Alliance, which is an association of companies that formerly manufactured asbestos-containing products that were used for building construction. We have been promoting for a number of years a rational, scientifically sound response to the problems that are raised by the presence of asbestos-containing materials in schools and other buildings, specifically, the adoption of uniform air-monitoring standards for determining when asbestos hazards may exist in schools or other structures.

Last year, when conferees met on the EPA Asbestos in Schools Program, they directed that $500,000 be used for asbestos air-monitoring studies, specifically for the purpose of better quantifying the risks of asbestos-containing materials in buildings; analyzed samples of various materials in different types of structures; schools that were receiving grants or loans under the Asbestos School Hazard Abatement Act, and ultimately, with the expectation of providing to Congress better methods for evaluating and ranking hazards and establishing funding priorities.

In sum, with respect to that $500,000, we strongly urge that the committee urge EPA to expedite those studies so that you, in turn, may benefit from whatever findings they may have.

Senator LEAHY. Have you actually made that approach to EPA? Have you urged them to move along with those studies?

Mr. WELCH. Indeed, we have, constantly.

Senator LEAHY. What kind of reaction do you get?

Mr. WELCH. I would characterize their response as ambiguous.

Senator LEAHY. I have had a couple of those responses myself. I know what you mean.

Mr. WELCH. Fairly stated. I think it is also fair to state that the growing body of medical and scientific opinion over the past 18 months, in particular, has focused on the fact that it is not the mere presence of asbestos-containing materials in the buildings that constitute the significant risk, but whether or not those materials are, in fact, airborne, and consequently, we urged, have continued to urge that EPA set forth an objective, unbiased method whereby schools can know when to act and to ensure that financial assistance, in turn, the Federal financial assistance is directed at the schools that really have problems.

I think that the value of air monitoring has another dimension apropos of this committee's consideration, and that is, focusing the limited financial resources that are currently available. Depending upon whose numbers you take, if you look at the National Education Association, for example, it says that the total paid for eliminating asbestos is $3 billion. EPA says $1.5 billion. The abatement contractors say it is a $20 billion market.

I think the proverbial bottom line on this is that I think it would be a tragedy if those sums of money were spent on needless removals which serve no useful purpose and indeed, may make safe conditions unsafe.

Senator LEAHY. Thank you very much.

Mr. WELCH. Thank you, sir.

[The statement follows:]

STATEMENT OF JOHN F. WELCH, PRESIDENT, SAFE BUILDINGS ALLIANCE

Thank you, Mr. Chairman. My name is John Welch, President of the Safe Buildings Alliance (SBA).

SBA is an association of companies who formerly manufactured or whose subsidiaries formerly manufactured asbestos-containing products for building construction. The Alliance was formed to promote a rational, scientifically-sound response to concerns raised by the presence of asbestos-containing materials in schools, specifically:

- o Adoption of uniform air monitoring standards to determine when friable asbestos-containing products in schools may pose an unreasonable risk.
- o Establishment of strict, but fair, training and certification programs for inspectors, laboratories, and contractors involved in assessment and corrective actions.
- o Practical, cost-effective alternatives to the hazardous and costly process of indiscriminate removal of asbestos-containing products.

When members of this Committee conferred last year on funding for EPA's school asbestos abatement program, the conferees directed that $500,000 be used for asbestos air monitoring studies (as specified in the House report) 1/

> Amendment No. 41: Limits funds available for administrative expenses for the school abatement program to $4,000,000 instead of $5,000,000 as proposed by the House and $2,500,000 as proposed by the Senate. The conferees direct that $500,000 of these funds be used for asbestos air monitoring studies as specified in the House report. The bill includes requirements for Federally funded school asbestos abatement projects to be conducted by trained, certified individuals. The conferees strongly support EPA's efforts to encourage State certification and training programs and urge the Agency to expand its asbestos information and training program from three to six centers.

The Committee should urge EPA to expedite these important studies so that current and future deliberations on school asbestos abatement may benefit from the findings.

EPA only partly succeeded in the development of more practical guidance to assist school officials in assessing hazards and evaluating appropriate abatement responses. The Agency's revised technical guidance document -- the so-called "Purple Book" -- acknowledges at long last what expert groups have cautioned for years: the mere presence of asbestos does not necessarily represent a significant health risk in schools or other buildings. Numerous studies 2/ 3/ 4/ 5/ have found perhaps the greatest potential from friable asbestos in buildings is not that the material may remain in place and only marginally add to ambient asbestos levels, but rather that poorly conducted removal will convert highly questionable pre-abatement risks into risks which are certain. EPA's more balanced guidance thus emphasizes that "[p]revalent levels of airborne asbestos inside buildings with ACM [asbestos-containing materials] may be 10 to 100 times higher than outdoor levels, "but such exposures are still "10,000 to 100,000 times lower than levels in industry workplaces where asbestos-related diseases have been well-documented." 6/ The Agency's policy statement on school asbestos abatement appropriately cautions that, "in most cases removal of asbestos-containing materials that are in good condition is not the most protective of health or most cost-effective approach." 7/

The message here is that risk is posed by the presence of airborne asbestos -- not by the simple existence of asbestos-containing materials in buildings. Yet, EPA still opposes an objective, air monitoring action level to provide an unbiased method for determining when to act and to ensure that Federal financial assistance is directed to schools with the most serious problems. Absent such a criterion, the emotionalism surrounding asbestos is likely to continue to fuel the rush toward unnecessary, expensive and dangerous removal activity. It is for this reason that we believe no major abatement -- removal, encapsulation, or enclosure -- should be undertaken without decisions based, at least in part, on air monitoring. The present EPA technical guidance is still only qualitative. There is a crying need for objective, quantitative evaluations based in some measure on air monitoring. Human intuition cannot replace hard science. Air monitoring by electron microscopy provides a badly needed objective standard. For schools, air monitoring can be a decision tool to be used with visual assessment to determine whether major abatement is necessary and, at the same time, a communications tool to prevent over-reaction and unwarranted removal.

The value of air monitoring has another dimension -- focusing limited resources. The National Education Association estimates that the total tab for eliminating asbestos hazards from the nation's schools is more than $3 billion. EPA estimates $1.5 to $2.0 billion. Abatement contractors see it as a $20 billion market. Spending such sums on needless removals would be a tragic waste of societal resources.

I appreciate the opportunity to participate in this hearing.

1/ H.R. Rep. No. 99-363, 99th Cong., 1st Sess. 13 (1985).

2/ Ontario Royal Commission on Asbestos, Briefing Notes, at 15-16, 27-28.

3/ D. Pinchin, "Asbestos in Buildings," Report to the Ontario Royal Commission on asbestos, at 7.12 to 7.13 (June 1982).

4/ United Kingdom Advisory Committee, Asbestos, Vol. II at 17 (1979).

5/ Bernstein, R. S., "A Review of the Scientific Basis for EPA's School Asbestos Hazard program, with Recommendations to state Health Officials," at 13 (Oct. 1984).

6/ EPA, "Guidance for Controlling Asbestos-Containing Materials in Buildings," 1-2 (June, 1985).

7/ EPA, "Policy Statement, 1986 Loan and Grant Program, Asbestos School Hazard Abatement Act," 8 (Feb. 13, 1986).

BRIEF RECESS

Senator LEAHY. With that, I am going to call a temporary recess until Senator Garn arrives.

[A brief recess was taken.]

STATEMENT OF ROBERT MARTIN, ON BEHALF OF UTE MOUNTAIN UTE TRIBE, OGLOLA SIOUX TRIBE, AND FORT BERTHOLD RESERVATION

ACCOMPANIED BY PABLITA ABEYTA, STAFF ASSISTANT

Senator GARN. Is Mr. Robert Martin here?

Mr. Martin, please proceed.

Mr. MARTIN. Chairman Garn, I am very grateful to appear here for the Ute Mountain Ute Tribe of Colorado, the Oglola Sioux Tribe, and the Fort Berthold Reservation and affiliates tribes of North Dakota. Appearing with me on the panel is Pablita Abeyta of the Navajo Nation. We are here to address the problems which our tribes and many other tribes in the United States are now experiencing relative to protecting our environments.

First, I would like to address the scope of the problem, and it is this. By EPA omission, by their own standards, EPA has comprised an area in the United States which is equivalent to all of the New England States, New Jersey, and Delaware combined. We are really responsible for protecting the quality of the environment in our homelands, except we have been unable to get adequate assistance to do that job for several years.

In effect, EPA has told us for several years that the legal authority just wasn't there to provide direct grants and other means of assistance to tribal governments like ours. So what has been done in the last year at the recommendation of several tribes is the adoption of tribal amendments to some of the major Federal environmental statutes like the Clean Water Act, the Safe Drinking Water Act, and the Superfund law.

Those have been approved by the Senate and the House and are now all pending in Congress. That is only half the job.

We think the other half of the job is to obtain funding which we need to do the job that has now been authorized in these laws. We don't think that the EPA's effort to date has been adequate. For example, last fiscal year, in 1985, the Agency provided a total of $5.7 million nationwide to Indian tribes, which comes out to maybe one-half of 1 percent, maybe seven-tenths of 1 percent of the Agency's total budget. This is notwithstanding the fact that Indian lands comprise a large area in the United States. Approximately 3 percent of the U.S. land mass is Indian land.

We believe that the true need for Indian tribes nationwide approaches somewhere near $20 million a year out of EPA's total national budget. We think that that money could be spent to address three needs in the Indian country. The first need would be to do a comprehensive reservation-by-reservation survey of Indian tribes to establish an environmental baseline in the areas of solid and hazardous wastes, air and water quality, drinking water and sewage needs.

For example, EPA estimates that at least half of Indian tribes' drinking water nationwide does not meet the minimally federally acceptable standards in the Safe Drinking Water Act; that many reservations have no drinking water whatsoever, like the Ute Mountain Ute Tribe of Colorado, nor do they have adequate sewage treatment systems. There are a lot of open dumps on reservations and many toxic waste sites.

There is a lot of concern about midnight dumping in reservations because it is perceived as a no man's land where you can get away with just about anything.

We think a great deal of this money could be used for establishing that kind of national, tribal environmental baseline which is essential to doing anything worthwhile in terms of spending EPA money on Indian lands in the future.

In addition, we think money could be used to strengthen EPA's media programs for Indian tribes in the area of direct grants, air or quality management, solid hazardous wastes. We think the money currently could be used to strengthen EPA's capability to implement all of the Federal environmental statutes on Indian lands. Right now, we don't believe that capability is there.

We think that these needs deserve to be met in view of the Federal trust responsibility which is owing to the tribes, and which EPA recognizes under their own Indian policy. That pretty much says it in a nutshell, Mr. Chairman.

STATEMENT OF PABLITA ABEYTA

Senator GARN. Thank you.

Do you have any comments you wish to make?

Ms. Abeyta. I would like to ask that my written statement be included in the record, and I would like to summarize my statement.

Senator GARN. It will be.

Ms. ABEYTA. OK. Since the adoption of the EPA Indian policy, Indian tribes and national tribal organizations have sought amendments to the Clean Water Act, Safe Drinking Water Act, and Superfund Act, which would recognize Indian tribes' proper authority to regulate and enforce environmental standards on Indian lands.

These provisions would permit tribes to participate in the Federal regulatory framework in a manner that is consistent with the EPA

Indian policy and inherent tribal sovereign powers in long-established Federal law and policy. Conferees in both the House and Senate have agreed to Indian amendments in the Safe Drinking Water Act, in the Superfund, and language in the Clean Water Act is currently under consideration.

With these amendments in place, we are now at the crossroads of securing funds to develop tribal environmental programs. Last year, this committee included report language directing EPA to make a concerted effort to address and approve various problems that occur on Indian reservations. In fiscal year 1987, no funds were requested by EPA for tribal programs.

On this basis, we must seriously question EPA's commitment to fully implement its Indian policy by adequately funding Indian environmental programs.

There are 274 federally recognized Indian tribes nationwide who occupy approximately 3 percent of the total land mass in the United States.

We feel that EPA should spend a proportionate amount in protecting reservation environments as it does in protecting the rest of the Nation's environment. Tribal environmental values cannot become a reality unless there is a financial commitment by EPA to provide funding for surveys identifying these needs.

Part of the dilemma for Indian tribes seeking funding for environmental programs has been the lack of baseline data. None of the agencies, including EPA, IHS, and BIA, have comprehensive data which identifies the environmental programs and needs on Indian reservations.

Language in the Indian amendments to the Safe Drinking Water Act, Clean Water, and Superfund directs EPA and IHS to conduct these necessary surveys to identify the drinking water problems, sewage treatment needs, and hazardous waste sites on Indian reservations.

Our request for fiscal year 1987 is $10 million for EPA to conduct the surveys now being authorized, as well as a slight increase for funding in all program areas for technical assistance to tribes to develop tribal environmental programs on Indian reservations.

In addition, we are requesting an appropriation of $5 million to enable EPA to begin to provide adequate assistance to tribes at the regional offices as well as at the central office.

In conclusion, many tribes have developed environmental programs and are ready to implement them. They cannot do so if there are no funds available. What tribal governments seek is fair and equitable treatment in developing sound environmental programs, not a piecemeal approach where tribes are funded upon a pilot basis. State programs were funded consistently and evolved to accomplish the missions set forth by Federal environmental laws.

Tribes should also be funded in a consistent manner with the proportional appropriate for long-neglected tribal environmental programs and needs.

In addition to my specific funding requests, we also recommend three things: No. 1, this committee direct EPA to submit a running account where funds have been spent for the last 5 years in the various program areas, the actual dollars amounts that went directly to Indian tribes, and what tribes were funded either through grants or financial assistance.

No. 2, this committee direct EPA to provide an estimated spending plan for optimum projected funding levels in each program area contingent upon the passage of laws being amended which clarify that tribal governments' role in the environmental statutes. With EPA's actual projection of needs should come a plan on how such funds should be spent, along with a mechanism to administering grants to Indian tribes.

Last, this committee direct EPA to identify and commit FTE in each program area in both the central office and the regional offices to provide guidance as well as to assure prompt and effective completion of the survey work being mandated by the authorizing committees.

Mr. Chairman, we thank you for this opportunity to present our views. We would be pleased to answer any questions.

Senator GARN. Thank you very much. I appreciate both of your coming. Your full statements will be printed in the record. Thank you.

Ms. ABEYTA. Thank you.

[The statements follow:]

STATEMENT OF ROBERT J. MARTIN, GOVERNMENTAL AFFAIRS COORDINATOR FOR HOBBS, STRAUS, DEAN & WILDER, ON BEHALF OF THE UTE MOUNTAIN UTE TRIBE OF COLORADO, THE THREE AFFILIATED TRIBES OF THE FORT BERTHOLD RESERVATION OF NORTH DAKOTA, AND THE OGLALA SIOUX TRIBE OF SOUTH DAKOTA

Mr. Chairman and members of the Subcommittee, my name is Robert J. Martin, Governmental Affairs Coordinator for Hobbs, Straus, Dean & Wilder. We appreciate this opportunity to present testimony on behalf of the Ute Mountain Ute Tribe of Colorado, the Three Affiliated Tribes of the Ft. Berthold Reservation of North Dakota and the Oglala Sioux Tribe of South Dakota. We intend to give you a brief overview of the magnitude of tribal environmental needs on a nationwide basis and a general idea of the particular environmental problems our client Tribes are now experiencing.

Currently, there are several hundred federally recognized Indian tribes and Alaska Native villages nationwide which occupy a combined area and environmental baseline the size of the New England states, Maryland and New Jersey combined. These Tribes have always been responsible for the environment they inhabited and have been good stewards of the environment for countless years. In fact, the Indian policy of the Environmental Protection Agency and of this Administration expressly recognizes that tribal governments are appropriately responsible for the quality of their environments and pledges a "government-to-government" relationship between the United States and the Tribes to achieve the goal of a safe and high quality environment.

Although we applaud the adoption of this policy by the EPA, we must question the EPA's commitment to sufficiently assess the magnitude of tribal environmental needs and to provide funding which is adequate to address those needs. For example, the total amount of funds expended by the EPA in F.Y. 1985 on Indian concerns was $5.7 million, or roughly 7/10% of the Agency's total budget last year. We feel that Indian tribes have been underfunded to the extent that the EPA has not spent a proportionate amount in protecting the Indian environmental base as it has in protecting the remainder of the national environmental base. In view of the fact that Indian tribes constitute approximately three percent of the Nation's land mass, therefore, the EPA should provide Indian tribes, at a minimum, approximately $20,000,000 in F.Y. 1987.

First, this amount should be earmarked for Indian tribes to be used in developing a comprehensive, reservation by reservation environmental data baseline in the specific areas of air and water quality, drinking water and sewage needs assessments and solid and toxic waste surveys. Pending tribal amendments to the Safe Drinking Water Act, the Federal Water Pollution Control Act and the Comprehensive Environmental Response, Compensation and Liability Act require that EPA conduct nationwide studies in these particular areas with great specificity. The results are to be submitted to the Congress from within one year of enactment of the reauthorizing legislation. Second, this funding should be used to strengthen existing tribal water, air, pesticide, solid and hazardous waste programs and to provide technical assistance for the development of environmental programs on reservations where none now exist, but where the Tribe has indicated a willingness and capability to operate such a program. Third, this funding should be used to provide the EPA with the necessary personnel and administrative resources to fully implement the environmental laws on Indian lands.

Many Indian tribes are prepared to administer environmental programs on their Reservations in order to meet urgent needs. For example, the Ute Mountain Ute Tribe has had no adequate system of potable drinking water since the establishment of their Reservation over a century ago. This has led to severe health problems and has severely curtailed their community development. The Tribe is ready to participate in the public water system and Underground Injection Control programs and eagerly anticipates working with the EPA and the Indian Health Service for planning, design and construction of a potable water system. The Three Affiliated Tribes of the Ft. Berthold Reservation now administer environmental programs in the area of air quality and pesticides management, but also have significant needs in the area of drinking water quality. The Tribes need a reservation-wide potable water system constructed to replace the existing method of obtaining drinking water from low quality groundwater underlying the Reservation. similarly, the Oglala Sioux Tribe now administers air quality and pesticides management programs, but needs funding to investigate potential hazardous waste sites on the Reservation which may be contaminating groundwater and drinking water supplies.

Immediate and sufficient assistance should be provided by the EPA to these and other Tribes, whose needs have so long been neglected by the Agency while the desires of other American citizens for environmental quality were being satisfied.

The level of funding requested should be provided by this Committee not only to give real effect to the Indian policy of this Administration and the EPA, but also to honor "the distinctive obligations of trust incumbent upon the government in its dealings with these dependent and sometimes exploited people." Seminole Nation v. United States, 316 U.S. 286, 296 (1942). Since the decisions of Chief Justice Marshall in Cherokee Nation v. Georgia, 30 U.S. (5 Pet.) 1, 16-17 (1831) and Worcester v. Georgia, 31 U.S. (6 Pet.) 515 (1832), the settled jurisprudence of the Courts has been that the United States "has charged itself with moral obligations of the highest responsibility and trust" in Indian affairs. Seminole Nation v. United States, 316 U.S. 296, 297 (1942). As the Court observed in Heckman v. United States, 224 U.S. 413 (1912) at 437:

> Out of its peculiar relation to these dependent peoples sprang obligations to the fulfillment of which the national honor has been committed. . . .

Thus, the Supreme Court often has held the United States to "the most exacting fiduciary standards" and to be bound "by every moral and equitable consideration to discharge its trust with good faith and fairness." *Seminole Nation v. United States*, 316 U.S. 296; *United States v. Payne*, 264 U.S. 446, 448 (1924). Most recently, the Court held the government to an "overriding duty to deal fairly with Indians" in *Morton v. Ruiz*, 415 U.S. 199, 236 (1974). Even more recently, the Ninth Circuit Court of Appeals has held that "*any* federal government action is subject to the United States' fiduciary responsibilities toward the Indian people." *Nance v. Environmental Protection Agency*, 645 F.2d 701, 711 (9th Cir.) *cert. denied*, ___ U.S. ____ (1981).

The EPA ignores this well established jurisprudence, which embodies the very guts of the federal trust responsibility owing to Indian tribes by the federal government and has served as the foundation for the Agency's Indian policy, by refusing to request direct and sufficient funding to meet the critical environmental needs of the Indian tribes. The responsibility for providing funds and technical assistance to the Tribes to address tribal environmental needs lies not with the States, but with the EPA itself. *State of Washington v. EPA*, 752 F.2d 1465 (9th Cir.) (1985). This Committee should provide the EPA the financial wherewithal to honor its fiduciary commitment to Indian tribes in F.Y. 1987 to fully protect reservation environments.

STATEMENT OF PABLITA ABEYTA, EXECUTIVE STAFF TO PETERSON ZAH, CHAIRMAN OF THE NAVAJO TRIBAL COUNCIL

Mr. Chairman and members of the Committee, my name is Pablita Abeyta, Executive Staff to Peterson Zah, Chairman of the Navajo Tribal Council. I appreciate this opportunity to present testimony on behalf of the Navajo Nation to request funding for Tribal Environmental Programs on Indian Reservations.

On November 8, 1984, the Environmental Protection Agency (EPA) announced its "Policy for the Administration of Environmental Programs on Indian Reservations." EPA is the only federal agency that has adopted an Indian Policy consistent with President Reagan's policy of government-to-government relations with Indian Tribes. While we commend EPA for their commitment to work with the Navajo Nation and other Indian Tribes on a government-to-government basis we must question EPA's commitment to fully implement its Indian Policy by adequately funding Indian environmental programs.

Since the adoption of the EPA Indian Policy Indian Tribes and National Tribal Organizations have sought amendments to the Clean Water, Safe Drinking Water and Superfund Acts which would recognize Indian Tribes proper authority to regulate and enforce environmental standards on Indian lands. These provisions would permit tribes to participate in the federal regulatory framework in a manner that is consistent with the EPA Indian Policy, inherent tribal sovereign powers and long established federal law and policy. The Conferees have agreed to Indian amendments in the Safe Drinking Water Act and Superfund, and language in the Clean Water Act is currently under consideration. With these amendments in place we are now at the crossroads of securing funds for technical assistance and the development of Tribal environmental programs. In the FY 87 Budget no funds were requested by EPA for Tribal programs. Tribal representatives presented testimony last year recommending that appropriations be earmarked for technical assistance and staff resources to develop tribal environmental programs on Indian lands. Congress did not include appropriations for the Tribes in FY 86, however this subcommittee did include the following report language directing EPA to identify some of the needs for tribal programs.

> "The Committee does feel that current levels of assistance clearly do not adequately address many serious and demonstrable problems confronting these semi-autonomous areas. The Committee, therefore, expects the Agency to make a concerted effort to improve in this respect within funds contained in appropriations bill." (Emphasis added)

While we appreciate the Senate directive for FY 86 we note that more needs to be done. American Indian reservations constitute approximately 3 percent of the total land mass in the United States. There are 274 Federally recognized Indian tribes nationwide who occupy a combined land area the size of the States of Maryland, New Jersey, Connecticut, Massachusetts, Vermont, New Hampshire, and Maine. We feel that EPA should spend a proportionate amount in protecting reservation environments as it does in protecting the rest of the Nations environment.

A recent report by EPA entitled "Environmental Programs on Indian Reservations" states the following:

> "In FY 85 EPA has expended approximately $5.7 million and 38 work years on activities that relate to environmental conditions on Indian reservations."

This report was based on an initial survey of the agency's current involvement on Indian reservations and includes technical assistance, federal assistance, consultant and training and work hours. For FY 86, approximately $2.4 million actually went directly to Indian Tribes under the various media programs such as Water, Air, Pesticides, and Hazardous Waste. This figure was distributed on an ad hoc basis throughout the regions.

The following table represents funding for Indian Tribes for FY 86:

PROGRAM		FUNDING
WATER		
U.I.C.		$55,585.
P.W.S.S.		171,800.
AIR		680,831.
RCRA		47,435.
CERCLA		33,600.
FIFRA		289,865.
	TOTAL	$1,789,116.
MULTIMEDIA PROGRAMS		
	TOTAL	510,000.
HEADQUARTERS		
	TOTAL	612,100.
	GRAND TOTAL	$2,401,216.

The EPA has been in existence since the early 1970's. Since that time EPA has worked with the states to develop sound environmental programs to protect the well-being and health of American citizens. With the evolution of these programs EPA has reduced its funding for technical assistance to the states, and has eliminated several special programs designed to assist States in the early stages of program development. Indian tribes have a great need for these types of assistance programs at the present time. Today Indian tribes are making environmental protection a part of their governmental agenda. This is reflected in our commitment to seek amendments to the environmental statutes as well as the development of Tribal Water, Air, Pesticide, Solid Waste, and Hazardous Waste programs. Tribal environmental values cannot become a reality unless there is a financial commitment by EPA to provide technical assistance, staffing and adequate funding for the evolution of tribal management of environmental programs.

Part of the dilemma for Indian Tribes seeking funding for environmental programs has been the lack of baseline data. None of the Agencies, including Environmental Protection Agency, Bureau of Indian Affairs and Indian Health Service, have comprehensive data which identifies the environmental problems and needs on Indian reservations. Language in the Indian amendments to the Safe Drinking Water Act and Superfund directs EPA and IHS to conduct surveys which identify drinking water problems and hazardous waste sites on Indian reservations. In addition, these surveys should identify what funding levels are adequate to address the environmental needs on Indian reservations. Similar language is included in both the House and Senate versions of the Clean Water Act. I'm sure if we had this data the figures would document Tribal needs. For example, we already know that over half of the tribes across the United States don't meet federally recognized drinking water standards. On the Navajo Nation there is a considerable population who live in remote areas who still haul water from stock wells and developed springs. Sadly the health and welfare of Native Americans has been a low EPA priority.

The Navajo Nation is the largest Indian reservation in the United States. The reservation covers 16 million acres, the approximate size of West Virginia. For many years, our lands have served the needs of a growing America hungry for energy and other natural resources. Extensive fossil-fuel and uranium development have occurred on the Navajo Nation. Two major uranium deposits are located in the Grants uranium belt and the Cameron uranium mining district. The four corners region of the Reservation is a major petroleum producing area. There are major coal mining activities going on. The after effects of such development is clearly evident, the Navajo Nation has 306 abandoned uranium mines alone which have been in existence for 35 years. Disposed of tailings have been used for construction of houses and highly contaminated soil has been used as mortar. This has created airborne radiation inside these dwellings which is 30 times the normal background level. We have a great concern for the health and safety of our people. At this point we have no clear picture of the status of water quality on the Reservation and how it is being impacted. There is now radioactive contamination of groundwaters and surface waters and instances of children swimming during the summer months in highly contaminated waters.

Less than half the reservation has running water and in some areas the water that is available is high in radionuclides, and alternative drinking water supplies need to be identifed. There is a strong need to expand the Public Water Supply Program on the Navajo reservation to locate and develop new community water systems. This cannot be accomplished without financial resources.

Solid Waste is another area where reservations are in desperate need of improvement. A low priority has been given to solid waste collection and disposal on Indian lands. Many sites consist of community dumps and landfills which are fenced and exposed to the open air. Health problems which result from improperly designed and operated landfill areas include contamination of groundwater and uncontrolled breeding of various disease carrying rodents. These problems have been verified by public health officials who indicate that a serious health threat could exist if the situation is not attended to immediately.

These are but a few examples of the types of environmental concerns which need to be addressed by EPA and the Navajo Nation. The surveys being authorized under the Safe Drinking Water, Clean Water and Superfund Acts will provide the essential information for an accurate determination of Tribal needs accross the United States. With that information, the Tribes, EPA and this committee can develop a rational plan for funding environmental protection on Indian lands.

For FY 87, we are requesting that this Committee earmark $10,000,000 for use by EPA to conduct the surveys now being authorized under the Safe Drinking Water, Clean Water and Superfund Acts. In addition, we are requesting an appropriation of $ 5 million to enable EPA to begin to provide adequate technical assistance to the Tribes and for the personnel and administrative resources necessary for full implementation of the federal environmental laws on Indian lands. These are modest requests. They reflect a reasoned approach to the environmental problems confronting Indian Tribes. Your approval of these requests will be a clear statement to EPA and to all Native Americans that Indian environmental concerns will finally be addressed. The authorizing Committees have already determined that such action is both necessary and appropriate. We now ask for the commitment of the fiscal resources necessary to implement these laws. Indian people expect and deserve the same environmental quality which has previously been made available to all other American citizens.

CONCLUSION

Last year this Subcommittee directed EPA to make an effort to improve funding for Indian environmental programs. EPA's record to date has been spotty. There are no line item requests for Indian programs in the EPA FY 87 Budget request. At a time when Indian amendments are pending in Conference for the Safe Drinking Water, Clean Water and Superfund Acts, many tribes have developed environmental codes and are ready to implement them. They cannot do so if there are no funds available. What tribal governments seek is fair and equitable treatment in developing sound environmental programs - not a piece-meal approach where tribes are funded on a pilot basis. State programs were funded consistently and evolved to accomplish the mission set forth by the federal environmental laws. Tribes should also be funded in a consistent manner with a proportionate amount appropriated for long neglected tribal environmental programs and needs. In addition to our specific funding requests, we also recommend that:

- This Committee direct EPA to submit a running account of where funds have been spent for the last 5 years in the various program areas, the actual dollar amounts that went directly to Indian tribes, and what tribes were funded either through grants or financial assistance.

- This Committee direct EPA to provide an estimated spending plan for optimum projected funding levels in each program area contingent upon the passage of the laws being amended which clarify the tribal governments' role in the environmental statutes. With EPA's projection of actual needs should come a plan on how such funds would be spent along with a mechanism for administering grants to Indian tribes.

- This Committee direct EPA to identify and commit FTE in each program area in both the Central Office and the Regional Offices to provide guidance as well as to assure prompt and effective completion of the survey work being mandated by the authorizing Committees.

Mr. Chairman, we thank you for this opportunity to present our views. We will be pleased to answer any questions at this time.

STATEMENT OF JOHN SIMON, PRESIDENT, NATIONAL HOUSING CONFERENCE

Senator GARN. Mr. Simon?

Please proceed.

Mr. SIMON. John Simon, president of the National Housing Conference. I apologize for being late.

Parenthetically, when you consider appropriating money for housing, the appropriate committee will take a look at the FAA? This is the fourth time my plane had engine trouble, between New York and Boston, has had trouble. I hope this isn't an omen.

Senator GARN. Maybe you better take Amtrack.

Mr. SIMON. I did that, and the engine conked out. I don't know what to do next.

Senator GARN. Let us know when you are traveling so we can stay on some other motive.

Mr. SIMON. Thank you. I appreciate the opportunity to testify before you. Mr. Cohen, who is the counsel for the National Housing Conference, has submitted to you a written statement as to the position of the National Housing Conference. I don't want to read a statement. I would just like to add a few items, if I may.

One of them is that whatever you are doing in appropriations for housing, please consider the fact that housing has taken the biggest cut, I believe, of almost any agency since 1981, and that, indeed, HUD's budget has been reduced by over 60 percent in the last several years,

Second, that in the 1986 budget, substantial cuts were made in housing, and what was left we had hoped would be implemented and the moneys be made available. We, of course, understand that a Gramm-Rudman cut of 4.3 percent had to be made, and we accept that fact.

We appeal to you not to make and further cuts. We appeal to you in the Senate so that the rescissions don't go through the House, as the House has already rejected a rescission. We hope you support that. Above all, we would like you to reject the deferrals that have been submitted by HUD and by OMB when the administration deferred to cut the housing program.

I must say to you that in addition, whatever moneys are available, HUD is not spending. We used to think at one time that HUD stood for "Help us delay." We now think it stands for "Help us destroy." Whatever money they have, they say they have to clear with OMB. OMB said they have to clear with them. None of the moneys appropriated are really being moved forward, and in this bouncing back and forth, industry, whether it is public, private, or nonprofit, doesn't really know where it stands.

We would like you to consider funding the Public Housing Program at least at the 1986 levels and make some provision for new public housing. We would like you to consider maintaining the 202 Program which has been so effective; to contunue the Rent Rehabilitation Program, which is an absolute necessity in most cities, and to consider also the fact that there are really no vacancies in most cities and certainly, no affordable vacancies.

In New York, the vacancy rate is somewhat above 2 percent, but I would dare say that the affordable vacancy rate is zero and that the Voucher Program really helps. HUD has made no analysis of the Voucher Program. We are not aware of any findings they have made that it works, and they have now planned to substitute the Voucher Program for the Section 8 Program, which we think will not help most people to find apartments.

I don't think it will save any money other than the fact it is a 5-year instead of a 15-year term. That chicken is certainly going to come home to roost some years down the road when people who may have found an apartment will need an extension of their Voucher Program. I would like to mention to you that in addition to the enormous waiting lists—and I can talk of personal experience in New York, a 21-year waiting list—my wife, director of the program in Baltimore, has an even longer waiting list for affordable housing.

Washington, DC, Miami, all these cities have these enormous wasting lists for low-income housing. In addition, there is a tremendous lack of affordable housing for young people, in particular, but also the elderly, who are above the public housing limits and can't afford the private market.

They must be helped by the Rent Rehabilitation Program. They must be helped by, hopefully, some tax incentives. They must be helped by having a HUD which will be appropriately funded to further these programs. In addition to the families that are the homeless, there is this group of families above the public housing limit and below the ability to pay private market rent that have to live doubled up, with family, with relatives, and with friends, in a very unhealthy climate, a climate in which it is not good to bring up children, and who have no hope, in a way, despite the interest rates, to obtain housing.

It is true that interest rates have dropped and we give credit to the administration for that fact, but while the interest rates have dropped, the cost of housing has gone up concurrently. So I think the two have canceled themselves out.

We ask you, please consider two things: Don't cut the HUD budget any further. You have, on your other hat, the power to make sure that HUD will spend the money it has; promulgate the regulations they have promised, and continue to be an active governmental agency and not just one that goes before they take any action to OMB and just defers and has no answers.

Second, do not cut the budget any further. We realize you have Gramm-Rudman possible staring you in the face. We are aware the deficit is serious. Housing has taken the biggest cut. I don't think we should take any further cuts.

On behalf of the National Housing Conference, I would like to say something that probably is not acceptable to everybody: that some revenue increases may be necessary, and that it is perhaps better to have revenue increases now than have a few years down the road a country very ill-housed.

Thank you for your attention.

Senator GARN. Thank you for your testimony. I am pleased that you think I have any influence over HUD. I have spent 15 years with HUD as a mayor, chairman of both their committees, and I figure I am irrelevant to them. I have more influence over Treasury and some other agencies I deal with only on a smaller part than I have with HUD.

It seems to have a life and a mind of its own, because believe me, if I had the influence some people think I do, HUD would be a very different organization, as Carl knows' He has heard my speeches over the years. He doesn't have to listen again.

But there are a lot of changes I would make.

Mr. SIMON. We like to drop your name occasionally in HUD, and it doesn't hurt.

Senator GARN. Maybe I should have you drop my name, because when I call them, it doesn't seem to have much impact. Anyway, we appreciate your willingness to be here and your full statement will be printed in the record.

Mr. SIMON. Thank you very much. I would like to introduce the new executive director of the National Housing Conference, Juliet Madison, who you may know from the previous work in NARO. She is the new executive director and has planned a very active organization and ready to do a public, private, and nonprofit partnership for housing.

Senator GARN. Happy to have you with us.

Ms. MADISON. Thank you very much.

Mr. SIMON. Thank you, again.

[The statement follows:]

STATEMENT OF JOHN SIMON, PRESIDENT, NATIONAL HOUSING CONFERENCE

Mr. Chairman and Members of the Subcommittee, my name is John Simon. I have recently been elected President of the National Housing Conference and I appreciate this opportunity to present my first testimony to a Congressional Committee on behalf of the National Housing Conference.

In reviewing the budget presented to the Congress for HUD for FY 1987 and NHC's testimony before the Subcommittee last year, I am struck by how similar a situation presents itself this year. Last year we typified the HUD budget request as an "unappropriation", because its adoption would have resulted in the undoing of 50 years of effort by the Federal Government to meet the nation's housing needs. NHC urged the Subcommittee to reject those budget proposals for HUD. You did reject those proposals. We and all who are concerned about the nation's housing and community development needs are most grateful to you for that rejection.

Again for FY 1987, you have been asked by the Administration to ignore the reality of need and to make funding decisions that can only lead to the ultimate demise of HUD. We again urge you to ignore those proposals. We also urge that you reject the proposed deferrals of FY 1986 HUD funds for the Community Development Block Grant, Section 8, 202 and the 312 Rehabilitation Loan programs, just as the HUD rescissions proposed for this fiscal year were allowed to die a couple of weeks ago.

While we were grateful for the rejection last year of the program-eliminating proposals of the Administration, we should like to urge that you approve for FY 1987 a somewhat more generous level of appropriations than those made available for FY 1986. The housing needs of the low and moderate income are still very substantial, as are the community development needs of our cities.

At the present time, the overall housing scene has improved, with the lowest mortgage interest rates in several years sustaining a housing production level of almost 2 million units per year and making it possible, once again, for a broad segment of the middle-income to be able to afford to purchase a home. In some places, new apartment projects are able to proceed without the reliance on tax-exempt financing that had become so necessary in recent years.

For this we all should be grateful. However, it, unfortunately, takes a lot more than an eight-year low in mortgage interest rates to bring housing within the financial reach of the millions of low and moderate income who still cannot find decent housing at prices they can afford. It is important that all segments of our society share in the improvement in their housing situation that the more fortunate are now experiencing. The degree to which this will occur is heavily dependent upon your actions on these HUD appropriations for FY 1987.

In the resolutions adopted by the National Housing Conference at its recently completed convention, we set forth those minimum program levels we believe are necessary to permit that sharing to start to occur. Many of these proposals are identical to those we made to you last year--they continue to represent a relatively modest level of assistance reflecting our recognition of the budget realities confronting you, but also reflecting our belief that the needs we have focused upon are real and cannot be ignored.

I have attached to my testimony a full set of our resolutions which I urge you to review. However, I should like to highlight some of the principal recommendations:

- The Public Housing Program should be continued at a level of 20,000 units. Modernization should be funded at a minimum level of $1.5 billion and adequate operating subsidies should continue to be appropriated.

- The Community Development Block Grant Program should be funded at a minimum level of $3.5 billion, with the Section 108 loan guarantee program continued at a $225 million level.

- The UDAG program should be continued at a $450 million funding level. We also suggest that consideration be given to providing the Secretary an additional $25 million discretionary fund to deal with those unusual and unique problems that are not fundable under normal criteria.

- Sufficient funds should be provided to support at least 200,000 additional units of multifamily housing for low and moderate income families and the elderly and the handicapped, using a combination of the 202, Housing Development Grant, Rental Rehabilitation, Section 8 moderate rehabilitation, and Section 8 certificate programs.

- Assistance for Section 8 vouchers, however, should only be provided at such minimal level as necessary to continue any ongoing experiments and commitments.

- We support 50,000 units of home ownership assistance, including the tried and proven 235 program and new initiatives, such as the Nehemiah program that has worked so successfully in New York.

- The 312 Rehabilitation Loan program should be continued at least at the loan repayment level.

- We urge rejection of any switch of housing programs of the Farmers Home Administration to HUD.

- Adequate guarantee levels should be provided for FHA, GNMA, and the Veterans Administration, to assure that these necessary programs are able to meet the demand which has soared in recent months with the return of more reasonable interest rates.

- No increase in the present user fees imposed under the various FHA, GNMA, and VA programs.

- Rejection of proposed reductions in fees for administering Section 8 certificater and of the proposal to require that one-half of such fees be paid by state or local government.

- Funds for sufficient staff to administer in a timely fashion HUD's many responsibilities.

We realize that the program levels we have recommended will require funds substantially in excess of those requested by the Administration, but our recommended levels, and the funds necessary to support them, are still substantially lower than what is needed. We have tempered our recommendations in recognition of the continuing deficit problems confronting the Federal Government. However, these housing and community development programs, to date, have absorbed far more than their fair share of the fight to deal with those deficits and should not be looked to any longer as a budget reduction resource.

We, therefore, urge the Subcommittee to recognize once again that the Federal Government does have a definite role to play in assuring that all its citizens have an opportunity for decent housing and a suitable neighborhood in which to live. Your past recognition of this role has been important, but your continued recognition is crucial if we are to maintain the progress of the past 50 years.

Thank you for this opportunity to appear today.

ENVIRONMENTAL PROTECTION AGENCY

STATEMENT OF JOE TALLAKSON, ON BEHALF OF PACIFIC NORTHWEST INDIAN TRIBAL GOVERNMENTS

Senator GARN. Joe Tallakson?

Mr. TALLAKSON. Chairman Garn, I appreciate the opportunity to appear before your subcommittee again this year. This would be the fourth year that I have appeared representing Pacific Northwest Indian Tribal Governments. and specifically, that is the Lummi, the Quinault, the Quileute, the Squaxin Island, and the Suquamish tribes around Puget Sound and along the Pacific coastline.

Senator GARN. I might just add, I am familiar with Quileute, the area out there. I spent 2 weeks of survival school when I was in the Navy and starved to death. I didn't catch anything; I didn't trap anything; and I lost about 18 pounds. I survived. But all those traps and snares and all the things I was taught by the naval survival school, none of them worked. [Laughter.]

I wasn't capable of making them work, but I did spend some 2 weeks in the rain forests out there, so I am very familiar with at least part of the area you are talking about.

Mr. TALLAKSON. It is God's country, as the Indian people talk about it, and they would very much like to keep it that way. That is why I am here.

We have seen some progress in terms of EPA's recognition that there are 274 federally recognized tribes out there and that they do comprise 3 percent of the land base, and we are pleased that an Indian policy was adopted in November 1984, and that last year, appearing before your committee, the Senate subcommittee gave quite some strong language, we felt, that said, "The committee does feel that current levels of assistance clearly do not adequately address many serious and demonstrable problems confronting the semiautonomous areas. The committee, therefore, expects the Agency to make a concerted effort to improve in this respect within funds contained in the appropriations bill."

Unfortunately, Mr. Chairman, the people addressing American Indian issues are kind of walking around with a tin cup begging in this time of budget cuts, begging within the various regions in EPA to actually address Indian needs.

The Agency itself, we fear, has developed a defensive posture in terms of actually providing moneys directly to Indian tribes. We don't feel the tribal governments or staff representing tribal governments should have to beg.

Therefore, I really feel, as we recommended last year, that you give serious consideration that we be provided possible language, that you might consider that, to earmark out of the Abatement, Control, and Compliance Program, $1 million and 20 FTE's for the central and regional offices that would be appropriate for serving Indian tribes.

These would be individuals who would be hired specifically to work with Indian tribes and earmark $10 million to be spent with Indian tribal governments, and we believe that a meaningful program would begin to be initiated for the American Indian people.

I appreciate the time that you have given me before the committee, and you should come out to the Pacific Northwest and, hopefully, it will be a more comfortable trip next time.

Senator GARN. I lived on Woodby Island, so it wasn't just the 2 weeks at Quileute. I spent a lot of time out there. In fact, my second child was born on Woodby. So I know that area of the country well, and I would disagree on where God's country is. I think it is in Utah, but the second place I would give would be the Pacific Northwest. I got to know the San Juans very well, I spent a lot of time flying up there, Neah Bay. I probably know that area, next to my own State, better than any place in the country.

Mr. TALLAKSON. Thank you, sir.

[The statement follows:]

STATEMENT OF JOE TALLAKSON, REPRESENTING SELECTED NORTHWEST INDIAN TRIBAL GOVERNMENTS

I appreciate the opportunity to again provide testimony regarding appropriations for the Environmental Protection Agency before this appropriations subcommittee representing the concerns of the Lummi, Quileute, Quinault, Squaxin Island, and Suquamish Indian Tribal governments located in Western Washington State. The 274 Federally-recognized Indian Tribes, nationwide, have jurisdictional responsibility for approximately 50 million acres offland or three percent of America's land base. Yet, EPA has requested no specific appropriations in FY87 to assist Tribal governments address their environmental concerns.

The EPA finally adopted an Indian Policy in November 1984 and claimed a nationwide $500,000 expenditure on Indian Tribal needs in FY85. Tribal representatives provided testimony last year recommending a specific appropriations earmark to require the EPA to begin to seriously target financial and staff resources to Indian Tribal government. The Congress did not provide an Indian Tribal set-aside; however, this subcommittee included the following instructive language:

> "The Committee does feel that current levels of assistance clearly do not adequately address many serious and demonstrable problems confronting these semi-autonomous areas. The Committee, therefore, expects the Agency to make a concerted effort to improve in this respect within funds contained in appropriations bill." (Emphasis added)

We appreciate this Senate directive for FY86. The EPA, unfortunately, has only exhibited limited and sporadic initiatives on behalf of American Indian Tribal interests. We conclude that the EPA will only be prodded into meaningful programmatic activities for American Indian people when funds are provided expressly for that purpose.

Draft subcommittee report language is enclosed for your consideration which would earmark from the EPA Abatement, Control, and Compliance program $1 million and 20 FTE for headquarters and regional office coordination/implementation of the EPA Indian Policy; $10 million for grants to American Indian Tribes and tribal organizations to assist Tribes in meeting their environmental responsibilities, specific amounts within these funds for technical assistance, forestry/fishery-related water quality studies, and clean lakes projects; and, directs the EPA Administrator to conduct a study coordinated with the Indian Health Service to determine Tribal water supply and water treatment facilities in compliance with minimum Federal standards.

American Indian people, representing the environmental conscience of the nation by their cultures, religions, and philosophies, have been virtually ignored by the EPA regarding assistance and resources to rehabilitate and protect their land and natural resources. We are not talking about minor hamlets, but a collective land base by EPA's own estimation that is larger than the combined area of the States of Maryland, New Jersey, Connecticut, Massachusetts, Vermont, New Hampshire, and Maine. This includes:

- 43,410,186 acres of rangeland and forests
- 1,829,118 acres of dry farmland
- 917,580 acres of irrigation farmland
- 913,000 acres of water reservoirs and lakes
- 3,199 natural lakes and ponds
- 12,000 miles of perennial streams

As Tribal governments are beginning major economic and natural resource development initiatives, their environmental needs are growing proportionately.

Although State governments have well established environmental programs, State governments are a most inappropriate mechanism for addressing Tribal needs. States have shown neither the inclination nor willingness to assist Tribes. Due to historical jurisdictional conflicts with States, Tribal governments deal directly through the Federal system. Unfortunately, the new Federalism block grants to States favored by this administration consistently ignores Indian tribes. Due to the sovereign status of Tribal governments and their treaty trust relationships with the United States, the EPA must deal directly with Indian Tribes and their environmental concerns.

Given an EPA appropriations earmarked for Tribal governments in FY87, the Pacific Northwest Tribal governments I represent would seek EPA resources to rehabilitate or protect spawning habitats for their anadramous salmon fisheries and monitor developments impacting their fisheries resources. Specifically, these Tribal governments request appropriations to implement their own environmental initiatives briefly described as follows:

LUMMI INDIAN TRIBE

The Lummi Indian Tribe, located on the Pacific Coast approximately 100 miles North of Seattle, currently operates the largest American Indian fishing fleet in North America. The reservation borders major commercial ocean shipping lanes creating potential ecological damage due to accidents or spillage. The watershed areas are threatened by commercial, residential, and recreational development.

The Lummi Fisheries Department currently operates an environmental review in conjunction with their fisheries enhancement efforts. Four fisheries biologists, a paralegal advisor, and technical support staff will be employed to study the Nooksack Basin watershed for fine sediment levels harmful to spawning gravel beds; review Federal, State, and local development permits; monitor forest logging practices in the watershed areas; and, serve as a Tribal linkage to city/county zoning decisions and agencies responsible for long-range planning.

Due to development activities in the area, the Tribe is particularly concerned with stream stability as studies have indicated that channel shifting and scouring are problems on many spawning streams. Further studies are planned to determine mortality on eggs within gravel beds due to shifting and fine sediment. Rearing habitat studies to establish baselines for measuring future change will be implemented including temperature levels and lowflow conditions. Salmon survey data is needed for many streams in the Nooksack Basin and research will be necessary to revitalize the depleted Spring chinook stock. The Lummi Fisheries Department also plans saltwater studies on herring populations to aid in harvest management as well as marine quality monitoring in Bellingham Bay with emphasis on mercury contamination of crab and bottom fish tissue. Project Cost: $510,000

QUILEUTE INDIAN TRIBE

The Quileute Indian Tribe, located at the mouth of the Quileute River on the Pacific Coast of the Olympic Peninsula, manages a natural river harbor for commercial ocean fisheries. With major reliance on a terminal net fishery, the Tribe is particularly concerned with logging and road building practices within the watershed.

A fisheries biologist will be employed to review and advise Tribal leadership on Federal/State and local permit applications, develop a working relationship with logging companies operating within the watershed area,and coordinate dialogue with Federal, State, and private organizations. Three existing U.S.G.S river gaging stations, closed by budget cuts, would be reactivated and managed by U.S.G.S. on a cost-sharing basis. Water quality monitoring would be undertaken to maintain baseline data with field analysis immediately available in case of emergency. An instream flow study utilizing State-of-the-Art technology will be initiated. And, due to the increasing number of small hydro-electric proposals in the area, minimum flow standards will be established for the river system in conjunction with the instream flow study to protect the fish habitat. Project Cost: $75,000

QUINAULT INDIAN NATION

The Quinault Indian Tribe, situated on the Olympic Peninsula bordering the Pacific Ocean, is responsible for four river systems on the reservation and several other rivers and watersheds in their usual and accustomed fishing areas. Extensive uncontrolled logging in this rain forest area and mismanaged logging over the past four decades on the reservation have created log jams and exposed habitat areas extremely damaging to native salmon stock spawning. The clearcutting practice on reservation has aggravated natural mildly acidic stream conditions creating a severe fish enhancement problem. The Grays Harbor Area in the Quinault usual and accustomed watershed is exposed to residential/commercial development, logging, coal mining, and industrialization.

The Quinault Tribe plans to employ a hydrologist, fish biologist, forester and support staff to investigate and identify water quality problems in the habitat area; enforce the Tribes recently enacted Forest Practices Act; study the effects of slash burning on water quality; and, determine the potential utilization of limestone or oyster shells for water acidity abatement. Two contracts will be let to clear logging residue on the Raft River and study the effects of herbicides, including Round-up, Garlon, and 24D on aquatic and terrestial wildlife in the unique Quinault rain forest environment. Project Cost: $350,000

SQUAXIN ISLAND TRIBE

The Squaxin Island Tribe owns an island in South Puget Sound near Olympia, Washington, and reside on the adjacent mainland. Commercial development on the mainland and in the waterways near the island and small tributaries present increasing potential degradation to water quality impacting commercial oyster production and harvest as well as the treaty watershed areas. The Washington State Department of Social and Health Services, in fact, has decertified selected beaches due to bacteria from human waste generated from boaters utilizing an adjacent State Park with inadequate restroom facilities.

The Squaxin Island Indian Tribe will employ an environmental coordinator and technical support staff to update and establish resource management plans; plan, supervise, and conduct baseline environmental data collection; implement a monitoring plan to measure resource quality; review proposed Federal, State, County, and local government development plans as well as pertinent permit applications and Environmental Impact Statements; and develop guidelines and negotiate improvements for the adjacent State Park. Project Cost: $100,000

SUQUAMISH TRIBE

The Suquamish Tribe, located on the East side of the Kitsap Peninsual in Puget Sound, has the largest usual and accustomed fishing area of any Tribe in Washington State. Although the Tribe has made extensive gains in enhancement, there is a growing concern that these gains will be offset in the future by preventable environmental degradation.

An environmental biologist will be employed to analyze pertinent watersheds and habitat, monitor stream flow and water quality for area streams as well as compiling data on spawning and rearing habitat within each watershed in the Tribal exclusive fishing area. The biologist will review planned development/construction projects in the watershed, determine the impact on the habitat, and advise the Tribal leadership. This staff-person would also be responsible for coordinating escapement data on salmon and steelhead stocks returning to area streams. Project Cost: $50,000

CONCLUSION

We advise that incremental assistance be provided to all Tribes in the ensuing years to assist in establishing effective environmental programs. Immediate assistance, as outlined in the proposed projects and proposed report language, should be made available to American Indian Tribes beginning in FY87. At the very least, Congress should instruct the EPA to allocate resources to ensure that reservation lands are given comparable environmental protection as the rest of the nation.

The proposed report language identifying $1 million and 20 FTE's, $10 million for Tribal grants, and an EPA/IHS study of water quality minimum standard compliance is attached for subcommittee consideration.

The Committee instructs the EPA to earmark appropriations from the Abatement, Control, and Compliance program to begin implementing the established American Indian Policy with EPA staff, technical assistance, and grant programs to assist Tribal governments as follows:

SALARIES AND EXPENSES

" $1,000,000 and 20 FTE to be divided between headquarters and regional offices for coordination and implementation of the EPA Indian Policy."

ABATEMENT, CONTROL AND COMPLIANCE

" $10,000,000 for grants to American Indian Tribes and tribal organizations to assist Tribes in meeting their environmental responsibilities, consistent with the EPA Indian Policy. In providing such assistance, EPA should emphasize tribal planning, tribal pilot projects, tribal program development, and technical assistance to tribal governments. These activities should involve all EPA media programs, including tribal 208 water quality management planning, section 103 and 105 air program grants, clean lakes program grants and pesticide applicator certification and enforcement grants. In providing such assistance to Tribes, EPA should exercise flexibility in making multimedia and interdisciplinary grants to Tribes, especially where this is appropriate to the small scale institutions found on many reservations."

Of these funds, at least $1,500,000 should be used to provide technical assistance to Tribes for developing tribal institutions, at least $1,500,000 should be used to fund tribal forestry-and fishery-related water quality studies, and at least $1,500,000 to complete tribal clean lakes projects.

The Committee also instructs the Administrator to undertake a study in coordination with the Indian Health Service, evaluating Tribal needs as required to permit compliance of tribal water supply and water treatment facilities with minimum federal standards. This study is to be submitted to the Congress within 18 months.

The Committee notes that the authorizing Committees of both the House and Senate have adopted (or have under consideration) amendments to the CERCLA, Clean Water and Safe Drinking Water Acts which call for the Administration to conduct surveys and inventories of Tribal needs under those Acts.

STATEMENT OF KEITH GEIGER, VICE PRESIDENT, NATIONAL EDUCATION ASSOCIATION

ACCOMPANIED BY JOEL PACKER, NEA STAFF MEMBER

Senator GARN. Is Mr. Keith Geiger here?

We have some good witnesses today, and we are a little bit ahead of schedule; amazing for a Senate subcommittee. Please proceed.

Mr. GEIGER. We will keep you ahead of schedule, too.

Thank you, Mr. Chairman.

My name is Keith Geiger. I am vice president of the National Education Association. With me is Joel Packer from our staff.

NEA's 1.8 million members are this Nation's public school teachers, education support employees, and higher education faculty and staff.

NEA appreciates this opportunity to testify today on funding for the Asbestos School Hazard Abatement Act and on the problem of asbestos in the schools.

This testimony that I am giving this afternoon has been endorsed by the following organizations other than the NEA: the American Association of School Administrators; American Federation of State, County and Municipal Employees; American Federation of Teachers; Citizen Action; National Campaign Against Toxic Hazards; National Congress of Parents and Teachers; Service Employees International Union, and the United States Public Interest Research Group.

I am here today with a very simple message: Millions of students and school employees are in grave danger as a result of their exposure to the silent killer, asbestos. The Congress can and must help rid our schools of this deadly menace. And an essential element in that task is for this subcommittee to recommend appropriating the full $100 million authorized for ASHAA for the 1987 fiscal year.

Despite widespread information about the pervasive and serious danger of asbestos in our Nation's schools, far too little has been done to protect our children and those who work in the public schools from the hazards of asbestos.

The question before us is not who has been at fault in the past. Asbestos manufacturers, local education agencies, Federal agencies, State legislatures, and the Congress all must bear some responsibility. The issue today is, What are we going to do now?

In the interest of millions of lives who will be ruined by continued exposure to asbestos, our Nation cannot drag its feet any longer. It would be unforgivable, given the widespread knowledge of the present asbestos danger in American schools, to know and not to act. The administration's proposal to totally eliminate funding for this program shows a callous disregard for the lives of millions of school children and the safety of school workers.

It is essential that we continue; that we, indeed, increase our investment in human health by fully funding the Asbestos School Hazard Abatement Act.

Thanks to the efforts of this committee, Congress appropriated $50 million to fund projects of the Asbestos School Hazard Abatement Act for fiscal year 1986. But much more needs to be done. Over $530 million in assistance was requested under the OSHA program, including more than $400 million for public local education agencies.

Separate surveys on the presence of asbestos in the schools by the General Accounting Office and the NEA show that three-quarters of all school districts in the Nation have at least one building with friable asbestos. The U.S. Department of Education estimates total cleanup costs at $3 billion.

The $100 million requested for this program for fiscal year 1987 is absolutely crucial to help these school districts with the greatest dangers and the least ability to fund responsible abatement projects. Some 13 States will have to reduce their appropriated budgets for fiscal year 1986, and 20 States intend to reduce their budget for fiscal year 1987.

Of the projects funded in the OSHA program, 80 percent were in school districts where the per capita income is less than $7,500.

We share this committee's concern that the projects funded by EPA are handled properly. We commend the committee for including in the fiscal year 1986 appropriation a requirement that contractors hired for OSHA funded abatement projects be certified by EPA.

Similar protections need to be extended to asbestos inspection and abatement programs in all of our schools. NEA strongly supports the Asbestos Hazard Emergency Response Act of 1986 introduced in both the House by Representative Florio as H.R. 4311, and in the Senate by Senator Robert Stafford in S. 2083. This act would require the EPA to set standards for safe and effective abatement procedures.

NEA believes these regulations must be instituted to ensure the safety of America's schoolchildren and school employees.

Without adequate funding, however, responsible abatement projects are impossible. Each day that we as a nation fail to act on this problem, millions of schoolchildren and school employees are subjected to the threat of disease and death. This threat continues. Your support of full funding for the OSHA program will help to save lives.

Thank you very much.

Senator GARN. Thank you. I appreciate very much your willingness to come and testify today.

Mr. GEIGER. Thank you.

[The statement follows:]

STATEMENT OF KEITH GEIGER, VICE PRESIDENT, NATIONAL EDUCATION ASSOCIATION

Mr. Chairman and Members of the Committee:

My name is Keith Geiger. I am Vice President of the National Education Association. NEA's 1.8 million members are this nation's public school teachers, education support employees, and higher education faculty and staff. NEA appreciates this opportunity to testify today on funding for the Asbestos School Hazard Abatement Act (ASHAA), and on the problem of asbestos in the schools.

This testimony has been endorsed by the following organizations: the American Association of School Administrators; American Federation of State, County, and Municipal Employees; Citizen Action; National Campaign Against Toxic Hazards; National Congress of Parents and Teachers (National PTA); Service Employees International Union, and United States Public Interest Research Group.

I am here today with a very simple message. Millions of students and school employees are in grave danger as a result of their exposure to the silent killer -- asbestos. The Congress can and must help rid our schools of this deadly menace. And an essential element in that task is for this Subcommittee to recommend appropriating the full $100 million authorized for ASHAA for the 1987 fiscal year.

Despite widespread information about the pervasive and serious danger of asbestos in our nation's schools, far too little has been done to protect our children and those who work in the public schools from the hazards of asbestos. The question before us is not who has been at fault in the past. Asbestos manufacturers, local education agencies, federal agenices, state legislatures, and the Congress all must bear some responsibility. The issue today is what are we going to do now. In the interest of the millions of lives who will be ruined by continued exposure to asbestos, our nation cannot drag its feet any longer.

Dangers of Asbestos Well Documented

I do not need to tell you about the dangers of asbestos. This Subcommittee is well aware of the fact that asbestos is a dangerous carcinogen; that exposure to asbestos can result in lung cancer, mesothelioma, and asbestosis. You have heard many times that 15 million children attend school in buildings contaminated by hazardous asbestos; that 1.5 million school employees work in buildings contaminated by hazardous asbestos.

I know you are also aware that children are at a greater risk than adults. In 1983, the EPA's Office of Toxic Substances cautioned: ``The age at which asbestos exposure occurs is very important in determining the lifetime risk of developing mesothelioma (cancer). This fact creates a special concern for asbestos exposure to children...A child exposed from age 5 to 10 will have about 10 times the chance of developing mesothelioma as an adult exposed to the same amount of asbestos between ages 35 and 40. In addition, children appear to be more susceptible than adults to (other) asbestos-related diseases.``

There are a number of reasons why children are more susceptible to asbestos-related diseases. Because they tend to be more active than adults, children inhale and exhale more often, and since they often breathe through their mouths, they circumvent the body's normal nasal filtering system. Therefore, children are particularly likely to inhale greater amounts of asbestos fiber.

Children's higher rates of metabolism and cell development also may increase their risk of developing an asbestos-related disease. And since children have a greater remaining lifespan than adults, they are more likely to develop such diseases during their lifetimes. The net effect of these facts spells real danger: since most asbestos-related disease take 15 to 40 years to manifest themselves, childhood exposure to asbestos can result in a person being stricken in the prime of life.

Not To Act Would Be Unforgiveable

That asbestos presents a hazard has been known by people in a position to do something about it since the 1930s, but it was not until 1973 that the use in the schools of ``spray-on`` asbestos was prohibited; not until 1978 did the EPA broaden this prohibition to cover other uses of asbestos. It would be unforgiveable -- given the widespread knowledge of the present asbestos danger in America's schools -- to know and not to act.

The Administration's proposal to totally eliminate funding for this program shows a callous disregard for the lives of millions of school children and the safety of school workers. To eliminate funding for ASHAA would be both fiscally shortsighted and morally reprehensible. It is essential that we continue -- indeed, increase -- our investment in human health by fully funding the Asbestos School Hazard Abatement Act.

ASHAA Award History

Thanks to the efforts of this Committee, Congress appropriated $50 million to fund projects of the Asbestos School Hazard Abatement Act for FY 86. The Enviromental Protection Agency is now in the process of collecting applications for grants and loans for FY 86. We commend the EPA for the revisions in the application process -- both those changes to simplify and streamline the process, including improved timelines -- and those changes made to ensure compliance with regulations governing testing and abatement, including an increase in EPA on-site inspections.

In June of 1985, the EPA offered the first $45 million in assistance to public and private schools to finance asbestos abatement projects.

The EPA offered awards to 198 school districts for 417 separate abatement projects in 340 schools. Approximately $12 million in grants and $33 million in interest free loans were offered on the basis of the severity of an applicant's asbestos-related problem and the school district's financial need. Public schools received $39.7 million in assistance, and private schools received $4.9 million in assistance.

The states which received the highest award amounts were Ohio, with $8.2 million in projects; Texas, with $5.1 million in projects, and Pennsylvania, with $4 million in projects. The school districts which received the largest individual awards were Houston (Texas) Independent School District, $5.1 million, and Cleveland (Ohio) Catholic Diocese, $2.5 million.

Awards to other selected states were Connecticut, $472,000; Nevada, $1.5 million; New York, $1.5 million; South Dakota, $130,000; Vermont, $269,000; Mississippi, $403,000; Wisconsin, $310,000; Louisiana, $2.3 million; and New Jersey, $2.2 million.

Some 323, or 77 percent, of the funded projects were for schools classified as having asbestos in a badly damaged state. The others were in schools classified as having asbestos in a state of moderate or minor damage.

ASHAA-funded projects will eliminate 4.7 million hours of student and employee exposure to asbestos per week.

Still More Must Be Done

But much more needs to be done. Over $530 million in assistance was requested under the ASHAA program, including more than $400 million for public local education agencies. EPA was able to provide only about one-tenth of the amount requested. Some 770 public local education agencies, representing approximately 4,600 individual public schools with 7,400 individual projects, applied for ASHAA grants and loans. Of those 7,400 projects, only 352 received funding.

But even the applications filed under the ASHAA program do not represent the full extent of the need.

Separate surveys on the presence of asbestos in the schools by the General Accounting Office and the NEA show that three-quarters of all school districts in the nation have at least one building with friable asbestos. The NEA survey of almost 1,000 school districts found that not only did the majority of districts have contaminated buildings, but nearly one in three school buildings contains friable asbestos. Respondents to the NEA survey indicated they had spent more than $86 million on asbestos abatement projects.

Based on these findings, the total cost of asbestos clean-up in the nation's schools is estimated at between $1.5 and $2 billion. The U.S. Department of Education estimates total clean-up costs at $3 billion.

The $100 million requested for this program for FY 1987 is absolutely crucial to help those school districts with the greatest dangers and the least ability to fund responsible abatement projects. Local school districts are beset by cutbacks and funding limitations from all sides. The Fiscal Survey of the States for 1986, published by the National Governors' Association and the National Association of State Budget Officers, reports that 13 states will have to reduce their appropriated budgets for FY 86, and 20 states will reduce their budget for FY 87. Many school districts have statutory or state constitutional limits on the amounts they tax and/or borrow.

Of the projects funded in the ASHAA program, 80 percent were in school districts where the per capita income is less than $7,500, and more than one-third were in school districts where the per capita income is less than $6,000.

We share this Committee's concern that the projects funded by EPA are handled properly. We commend the Committee for including in the FY 86 appropriation a requirement that contractors hired for ASHAA-funded abatement projects be certified by EPA. In addition, EPA has strengthened its requirements for ASHAA grant and loan recipients.

The improved inspection and targeting provisions, greater coordination with related Agency programs, and the contractor certification and training requirements will ensure that the projects under the ASHAA program are properly conducted and that federal funds for this purpose are well spent.

Regulations Necessary for Responsible Abatement

Similar protections need to be extended to asbestos inspection and abatement programs in all schools. NEA is not only concerned that something be done about the hazards of asbestos, but that the actions taken to address this danger be proper.

Rep. James Florio, Chair of the House Subcommittee on Commerce, Transportation and Tourism, recently reported that an asbestos abatement contractor in New Jersey had workmen rip asbestos off school walls with their bare hands and flush it down the toilet. When the lives of our nation's children are at stake, we cannot afford half measures nor such dangerously irresponsible action.

NEA strongly supports the Asbestos Hazard Emergency Response Act of 1986 introduced in both the House by Rep. Florio as H.R. 4311 and in the Senate by Sen. Robert Stafford as S. 2083. This Act amends Title II of the Toxic Substance Control Act by requiring the EPA to set standards for safe and effective abatement procedures NEA believes this is absolutely necessary to prevent further damage done in an effort to address this serious health hazard.

In instances where removal was improperly done, the ripping, chipping, peeling, and smashing of tons of asbestos substances from walls, ceilings, and other spaces has released enormous amounts of sub-micron asbestos fibers into the air, creating greater hazards than before.

Proper testing and filtration are vitally important. The

National Cancer Institute reports that analysis of actual tissue from dead asbestos cancer victims reveals that all asbestos fibers examined in the lung were less than 0.5 microns in diameter, and many of the testing procedures currently used cannot detect such small fibers.

Without proper filtration procedures, high concentrations of invisible sub-micron fibers can remain airborne indefinitely. Improper testing procedures have resulted in some school districts spending a million dollars to remove materials which were not asbestos or posed no danger, while other school districts paid out a million dollars for abatement projects which left the building's environment contaminated.

Regulations requiring responsible abatement must be instituted to ensure the safety of America's schoolchildren and school employees. These regulations will also ensure that the money Congress appropriates for abatement projects will be well spent.

Without adequate funding, however, responsible abatement projects are impossible. Responsible abatement projects to address this hazard in our nation's schools must not be delayed. Each day that we as a nation fail to act on this problem, millions of schoolchildren and school employees -- in the false belief that they are in a secure environment -- are subjected to the threat of disease and death. This threat continues. Your support of full funding for the ASHAA program will help save lives.

Thank you.

STATEMENT OF JOHN MANNION, DEPUTY EXECUTIVE DIRECTOR, AMERICAN WATERWORKS ASSOCIATION RESEARCH FOUNDATION

Senator GARN. Is Mr. John Mannion here?

Mr. MANNION. Mr. Chairman, I am John B. Mannion, the deputy executive director of the American Waterworks Association Research Foundation, a national organization headquartered in Denver, CO.

Our purpose in appearing before the committee today is not to ask for funding as we have in the last 3 years. Instead, we want to express our appreciation of your past help and to report on the progress which the water supply industry has made in establishing a nationally coordinated research program independent of Federal research.

When we first appeared before the committee in 1983, we had two compelling reasons for doing so. The first was our concern over the decline of Federal funding for the type of research which local water departments depend on to provide affordable service to the public and to comply with Federal and State drinking water standards. Our second reason was to enlist your assistance in helping to demonstrate to the water utilities of America that a centralized research program directed at their common problems can be cost effective and efficient.

In 1983, 1984, and again last year, we requested add-on funding of $1 million each year, and despite the difficulties faced by the committee, you responded favorably to our requests. In turn, we matched these add-ons dollar for dollar, and as a result, the $3 million provided for the committee produced more than $6 million in actual research effort.

I hope you agree that a 100-percent match was a remarkable achievement for any type of Federal-industry cooperative effort.

I would like to point out how the AWWA Research Foundation used your funding. In the first 2 years, the add-ons provided by the committee have funded 45 research projects, which are being carried out by existing institutions, not by our own small staff. Involved in working on these projects are 42 local water utilities, 25 universities, 30 consulting engineering firms, and health departments from 7 different States.

These numbers will increase when the projects funded from the fiscal year 1986 add-on are finalized this June. Most, if not all, of these projects would not have been funded by the Environmental Protection Agency because of Federal budgetary constraints.

Equally noteworthy is the fact that the results which have been obtained will be beneficial to water consumers throughout the United States, regardless of the size of the utility that serves them. Examples include the study done by the Utah State Department of Health, which identified the barriers to the development and installation of technology specifically designed to improve small systems compliance with drinking water regulations.

Now that these barriers are clearly identified, the industry, States, and Federal Government are cooperating to eliminate them.

The second and perhaps most important result of the committee's add-on funding is that research has won the industry's attention and support. Your assistance enabled the research foundation to demonstrate conclusively the need for, and the effectiveness of, a centralized water industry research program. Over the past months, the AWWA Research Foundation, with the active cooperation of the American Waterworks Association, the National Association of Water Companies—they are the investor-owned utilities—and the Association of Metropolitan Water Agencies, has initiated an historic venture which we believe will make self-funded water utility research a reality next year and the year after.

We are launching a research subscription program in which local ratemaking bodies will voluntarily include a small subscription for research in their rate base.

We shall formally begin the program in 1988, with an annual budget in the $5 million to $6 million range. By 1990, we shall have contacted the approximately 2,800 water utilities which serve more than 10,000 people. A positive response to that appeal could easily provide our goal of $10 million in research funding by 1990 at a cost of about a penny a month to the average ratepayer.

This would almost match the current Federal commitment to drinking water research and would provide the resources necessary to develop new technologies that would ensure that drinking water remains the safest and most affordable product on the market.

This rapid progress would not have been possible without the seed funding which your committee so generously provided the last 3 years.

Finally, Mr. Chairman, we urge the committee to provide adequate funding for EPA's drinking water research and development program. Our research program is designed to complement, not supplant, EPA's effort. There is need both for the applied technological research conducted by our own foundation and for the regulatory public policy research conducted by EPA.

They are not competitive; they are complementary.

The reauthorization of the Safe Drinking Water Act identifies dozens of potential contaminants in drinking water which must be monitored and controlled. It also mandates strict schedules for standard setting and compliance. Water utilities look to EPA to provide the health effects research that will form the basis of this new standard setting.

That, in turn, will drive part of our technological research. We sincerely hope that the committee will be able to provide the Agency with sufficient funds to enable it to meet its obligations under the Safe Drinking Water Act.

Our point is this, Mr. Chairman: Local officials and the public must have confidence in the EPA regulatory program. Many millions, even billions of dollars of public funds are at stake when regulations expand and new treatment methods are required.

Those costs will be palatable to the Nation only if the public is persuaded that the health effects are real.

Our research is aimed at technological and operational improvements. We rely on the Government for that health effects research. In summation, Mr. Chairman, we appreciate the opportunity today to assure you that the funds you have provided in the past have purchased immediate and much-needed water quality research and would otherwise have not been undertaken.

Even more importantly, you have enabled us to launch a water utility finance effort which we believe will continue to serve the needs of the American public for decades to come.

Thank you, Mr. Chairman.

Senator GARN. Thank you, Mr. Mannion.

[The statement follows:]

STATEMENT OF JOHN B. MANNION, DEPUTY EXECUTIVE DIRECTOR, AMERICAN WATER WORKS ASSOCIATION RESEARCH FOUNDATION

Mr. Chairman, I am John B. Mannion, Deputy Executive Director of the American Water Works Association Research Foundation. Our purpose in appearing before the Committee today is not to ask for funding in FY87 as we have in the last 3 years. Instead, we want to express our appreciation for your past help and to report on the remarkable progress which the water supply industry has made in establishing a nationally coordinated research program, independent of federal funding.

When we first appeared before the Committee in 1983 we had two compelling reasons for doing so. The first was our concern over the decline of federal funding for research into the everyday problems faced by water utilities. This is the type of research which local water departments depend upon to provide affordable service to the public and to comply with federal and state drinking water standards. Our second reason was to enlist your assistance in helping to demonstrate to the water utilities of America that a centralized research program directed at their common problems can be cost-effective and efficient. We felt that such a positive demonstration would spur the industry toward establishing its own internal research effort.

In 1983, 1984, and again last year we requested add-on funding of $1 million dollars. Despite all the difficulties faced by the Committee, you responded favorably to our requests. In return, we matched these add-ons and as a result the $3 million provided by the Committee produced more than $6 million in actual research effort. I hope you agree that by itself a 100 percent match was a remarkable achievement for any type of federal-industry cooperative program. But even more important, this success has been but the beginning of a program that promises to make local water departments more knowledgeable and efficient.

The AWWA Research Foundation used your funding in two ways. First, we launched an ambitious, technologically oriented research program in cooperation with EPA, states, universities, consulting engineers and water utilities from every part of the country. In the first two years the add-ons provided by the Committee have funded 45 research projects. Forty-two water utilities, 25 universities, 30 consulting engineering firms and health departments from seven different states have been involved in working on these projects (see attachment #1). These numbers will increase when all the projects funded from the FY86 add-on are finalized. Most, if not all of these projects, would not have been funded by the Environmental Protection Agency because of federal budgetary constraints. Furthermore, these projects are monitored by more than 125 volunteer professionals who are donating their time and expertise to AWWARF. These objective experts provide one of the most stringent internal peer review processes to be found anywhere in the world of research.

Equally noteworthy is the fact that the results which have been obtained will be beneficial to water consumers throughout the United States, regardless of the size of the utility which serves them. Examples include the study done by the Utah State Department of Health which identified the barriers to the development and installation of technology specifically designed to improve small water systems' compliance. Now that these barriers are clearly identified, the industry, states and federal government are actively moving to eliminate them. The indirect additives work being done by the New York State Department of Heatlh and the corrosion study being done by the Suffolk (NY) County Water Authority will both produce tremendous benefits for the entire industry. These are just three examples from among many I could have mentioned in which the industry is already beginning to reap benefits from a centralized and applied research effort.

The second and perhaps most important result of the Committee's add-on funding, and the attendant increase in research projects, is that research has won the industry's attention and support. Your assistance enabled AWWARF to demonstrate conclusively the need for and the effectiveness of a centralized water industry research program. Over the past few months, AWWARF, with the active cooperation and support of the American Water Works Association, the National Association of Water Companies, and the Association of Metropolitan Water Agencies has initiated a historic venture which we believe will make a self-funded water utility research program a reality next year and thereafter.

We have already approached 140 of the leading water utilities in the country and requested that their local ratemaking bodies voluntarily include a small subscription for research in their rate base. To date, 117 of these 140, or more than 83 percent have agreed to join in a two year interim funding effort. A list of their names is attached to our statement (attachment #2). Our goal is to raise $1 million dollars in 1986 and to double that amount in 1987 to replace the Committee's add-on. Over the next two years we will also be contacting an ever-expanding number of utilities and asking them to participate in our subscription effort. We hope to formally begin the program in 1988 with an annual budget in the $5 million to $6 million range.

By 1990, we shall have contacted the approximately 2,800 water utilities which serve more than 10,000 people. A positive response to our appeal could easily provide our goal of $10 million in research funding by 1990 at a cost of about a penny a month to the average ratepayer. This would almost match the current federal commitment for drinking water research and would provide the resources necessary to develop new technologies that would ensure that drinking water remains the safest and most affordable product on the market.

A nationally coordinated, self-funded water utility research program seemed to be very far in the future when we first came before you in 1983. Today, we are on the verge of making it a reality. This rapid progress would not have been possible without the seed-funding which the Committee so generously provided over the past three years. Nor would it have been possible without the advocacy of a number of local water utility managers including representatives from the water utilities of Salt Lake County Water Conservancy District and Salt Lake City in Utah; Louisville, Kentucky; Long Island, New York; New Haven, Connecticut; and Burlington, Vermont who have appeared before the Committee at various times in support of our add-on requests. We want to salute and thank our colleagues as well as you, the members of this Committee, who responded to their request for assistance. Much of our momentum towards creating a voluntary subscription program has come from our desire to keep faith both with the Committee and with our own leaders who made these promises on behalf of the Foundation.

Finally, Mr. Chairman, we urge the Committee to provide adequate funding for EPA's drinking water research and development program. Our research program is designed to complement, not supplant, EPA's research effort. There is a need for both the applied, technological research conducted by AWWARF and the regulatory, public policy research conducted by EPA; they are not competitive, they are complementary. The reauthorization of the Safe Drinking Water Act, which is in the final stages of conference, identifies dozens of potential contaminants in drinking water which must be monitored and controlled. It also mandates strict schedules for standard setting and compliance. Water utilities look to EPA to provide the health affects research that will form the basis for this new standard setting which, in turn, will drive part of our technological research. We sincerely hope that the Committee will be able to provide the Agency with sufficient funds to enable them to meet their obligations under the Safe Drinking Water Act. .

Local officials and the public must have confidence in the EPA regulatory program. That program must be based on solid research, not bureaucratic guesswork. Many millions, even billions, of dollars of public funds are at stake when regulations expand and new treatment methods are required. Those costs will be palatable to the nation only if the public is persuaded the risks are real, the research is believable. Our research is aimed at technological and operational improvements. We rely on the government for health effects research.

In summation, Mr. Chairman, you and your colleagues always asked two questions when we returned to request another add-on. First, what had we accomplished with last year's money and second, what would any future add-on buy? We have appreciated the opportunity today to assure you that your funds have purchased immediate and much needed water utility research that would not otherwise have been undertaken. A list of our projects is attached for your information (attachment #3). Even more importantly, you have enabled us to launch a water utility financed research effort which we believe will serve the needs of the American public for decades to come.

Attachment #1

PARTICIPANTS IN CURRENT RESEARCH PROJECTS*

STATISTICAL SUMMARY:

Current research program involves 41 utilities in 21 states; 25 universities in 23 states; and 30 other organizations (such as consulting engineering firms) in 18 states. In all, AWWARF research is being conducted in 32 of the 50 states.

AWWA RESEARCH FOUNDATION

Participants in Current Research Projects

DRINKING WATER ADDITIVES THIRD PARTY PROGRAM

Advisory Committee

G. Wade Miller
President
Wade Miller Associates
Arlington, VA

David A. Gregorka
Manager, Program Development
National Sanitation Foundation
Ann Arbor, MI

Nina McClelland, Ph.D.
President & Chief Executive Officer
National Sanitation Foundation
Ann Arbor, MI

Arthur Perler
Office of Drinking Water
U.S. EPA
Washington, D.C.

*This list does not reflect the 1986 research projects that will be awarded in July 1986.

Note: The second listing of a name on this document will be followed by an asterisk. Please refer to initial listing for affiliation and location.

BLOOD PRESSURE/SODIUM STUDY

Edward J. Calabrese, Ph.D.
Professor, Division of Public Health
University of Massachusetts
Amherst, MA

NORTH PENN TRICHLOROETHYLENE REMOVAL

Harry J. Borchers, Jr.
Executive Manager
North Penn Water Authority
Lansdale, PA

GIARDIA METHODOLOGY - IMMUNOFLUORESCENCE TECHNIQUE FOR DETECTION OF CYSTS IN CONCENTRATES FROM DRINKING WATER

John L. Riggs, Ph.D.
Viral & Rickettsial Disease Laboratory
California Department of Health Services
Berkeley, CA

Advisory Committee

Henry J. Ongerth
Consultant
Berkeley, CA

Edwin C. Lippy, P.E.
Municipal Environmental Research Lab
U. S. EPA
Cincinnati, OH

Richard J. Karlin, P.E.
Chief, Drinking Water Section
Colorado Department of Health
Denver, CO

CONTROL OF ALGAE IN RESERVOIRS

Richard Barnett
Water Quality Supervisor
Casitas Municipal Water District
Oak View, CA 93022

Advisory Committee

Jack Dice
Quality Control Engineer
Denver Water Department
Denver, CO

Michael J. McGuire, Ph.D.
Water Quality Manager
Metro Water District of So California
Los Angeles, CA

Robert Hoehn, Ph.D.
Civil Engineering Department
Virginia Polytechnic Institute
Blacksburg, VA

DEVELOPMENT OF REALISTIC REPLACEMENT/REHABILITATION CRITERIA FOR DISTRIBUTION SYSTEM COMPONENTS OF WATER UTILITIES

D. Kelley O'Day
PEER Consultants, Inc.
Philadelphia, PA

W. S. Flynn
Water Works Chief Engineer
City of Cincinnati
Cincinnati, OH

John Davis
Hydraulic Engineer
Denver Water Department
Denver, CO

John L. Huber
Manager, Engineering & System Planning
Louisville Water Company
Louisville, KY

Dennis D. Blair
Planning & Research
City of Philadelphia Water Department
Philadelphia, PA

Jerome B. Gilbert
General Manager
East Bay Municipal Utilit. District
Oakland, CA

Fred Nelson
General Manager
Kenosha Water Utility
Kenosha, WI

Advisory Committee

Theodore C. Pope, Jr.
General Manager
Orlando Utilities Commission
Orlando, FL

Robert M. Clark, Ph.D.
Drinking Water Research
U.S. EPA
Cincinnati, OH

Richard P. McHugh
Exec. Director & Chief Executive Officer
South Central Connecticut Regional Water Auth.
New Haven, CT

IDENTIFICATION AND TREATMENT OF TASTE AND ODOR PRODUCING COMPOUNDS

Patrick R. Cairo
General Manager, Planning & Engrg.
Philadelphia Water Department
Philadelphia, PA

I. H. Suffet, Ph.D.
Environmental Studies Institute
Drexel University
Philadelphia, PA

Thomas L. Yohe
Research Director
Philadelphia Suburban Water Co.
Bryn Mawr, PA

Advisory Committee

Michael J. McGuire*
Jack Dice*
Robert Hoehn, Ph.D.*

MANGANESE TREATMENT BY SIMULTANEOUS ADDITION OF SODIUM SILICATE AND CHLORINE

R. Bruce Robinson, Ph.D.
Assistant Professor of Civil Engineering
The University of Tennessee
Knoxville, TN

MODE OF ACTION OF CHLORAMINES

Vincent P. Olivieri, ScD
Associate Professor
The Johns Hopkins University
Baltimore, MD

RESEARCH FOUNDATION/KIWA (NETHERLANDS) JOINT SURROGATES REPORT

American Contributors

William J. Cooper
Drinking Water Research Center
Florida International University
Miami, FL

Roger A. Minear, Ph.D., Director
Institute for Environmental Studies
University of Illinois-Champaign/Urbana
Urbana, IL

Philip C. Singer, Ph.D.
Professor, Dept. of Env. Health Engineering
University of North Carolina
Chapel Hill, NC

Perry L. McCarty, Ph.D.
Professor, Dept. of Civil Engineering
Stanford University
Stanford, CA

Paul C. Chrostowski, Ph.D.
Scientist
Ecological Analysts
Columbia, MD

Gary L. Amy, Ph.D.
Associate Professor, Dept. of Civil Engrg.
University of Arizona
Tucson, AZ

Paul V. Roberts, Ph.D.
Professor, Dept. of Civil Engineering
Stanford University
Stanford, CA

Alan A. Stevens
U. S. EPA
Cincinnati, OH

James K. Edzwald, Ph.D.
Professor, Dept. of Civil Engineering
University of Massachusetts
Amherst, MA

I. H. Suffett, Ph.D.*

SURFACE WATER QUALITY SCREENING MODEL - A CASE STUDY FOR UTILITY MANAGEMENT

Walter M. Grayman, Ph.D., P.E.
Consulting Engineer
Cincinnati, OH

Harold Katner
Executive Director
Sewerage & Water Board of New Orleans
New Orleans, LA

Advisory Committee

Richard H. Moser
Vice President
American Water Works Service Co.
Marlton, NJ

Robert M. Clark, Ph.D.*

Foster S. Burba
President
Louisville Water Company
Louisville, KY

BARRIERS TO THE INTRODUCTION OF NEW PRODUCTS AND TECHNOLOGIES INTO WATER SUPPLY SYSTEMS

Gayle Smith, P.E.
Director
Bureau of Public Water Supplies
Salt Lake City, UT

G. Wade Miller*

Advisory Committee

Carol H. Tate, Ph.D.
Vice President
J.M. Montgomery Consulting Engineers
Pasadena, CA

Gary Logsdon, Ph.D.
U. S. EPA
Cincinnati, OH

William C. Ford
Director, Public Drinking Water Program
Missouri Dept. of Natural Resources
Jefferson City, MO

EVALUATION OF SURROGATE ORGANIC PARAMETERS AS AN INDICATOR OF WATER QUALITY

Edward J. Stanek, III, Ph.D.
Division of Public Health
University of Massachusetts
Amherst, MA

Advisory Committee

Jack DeMarco
Superintendent, Water Qual. & Research
Cincinnati Water Works
Cincinnati, OH

Michael J. McGuire, Ph.D.*
Alan A. Stevens*

STUDY OF TREATMENT PRACTICES FOR REMOVAL OF GIARDIA LAMBLIA CYSTS

Jerry Ongerth, Ph.D., P.E.
Assistant Professor
Dept. of Environmental Health
University of Washington
Seattle, WA 98195

John L. Riggs, Ph.D.*

Graeagle Water Treatment Plant
Graeagle, CA

Darrington Water Treatment Plant
Darrington, WA

Crystal Mountain Water Treatment Plant
Crystal Mountain, WA

Advisory Committee

William Liechty
Dept. of Social & Health Sciences
State of Washington
Olympia, WA

Gary Logsdon, Ph.D.*
Richard J. Karlin*

THE USE OF OZONE AS A PREOXIDANT IN DRINKING WATER TREATMENT

John A. DeKam
Superintendent
Bay Metro Water Treatment Plant
Bay City, MI

Walter J. Weber, Jr., Ph.D.
Environmental Water Resources Engrg.
University of Michigan
Ann Arbor, MI

Advisory Committee

Robert L. Chapman
Asst. Director, Water Engineering
CH2M Hill Consulting Engineers
Denver, CO

Benjamin Lykins, Jr.
U. S. EPA
Cincinnati, OH

Vernon L. Snoeyink, Ph.D.
Professor, Dept. of Civil Engineering
University of Illinois
Urbana, IL

CHLORO-ORGANIC WATER QUALITY CHANGES RESULTING FROM MODIFICATIONS OF WATER TREATMENT PRACTICES

Stephen A. Hubbs
Research Engineer
Louisville Water Company
Louisville, KY

George C. Holdren, Jr.
Assoc. Professor, Water Resources Laboratory
University of Louisville
Louisville, KY

Advisory Committee

Richard Valentine, Ph.D.
Dept. of Civil & Environ. Engineering
University of Iowa
Iowa City, IA

Michael J. McGuire, Ph.D.*
Alan A. Stevens*

WATER QUALITY DETERIORATION IN DISTRIBUTION SYSTEMS - Consumers/Pirnie

Hugh Hanson
President
Consumers/Pirnie Utility Svc. Co.
Hamden, CT

Ron Fauls
Superintendent of Filtration
Ohio Water Service Company
Poland, OH

James Cadwell
Superintendent of Filtration
Ohio Water Service., L.E.W.
Mentor, OH

Jeffery L. McNelly
Water Quality Director
Camden & Rockland Water Company
Rockland, ME

Steve Himmell
Operations Manager
Kankakee Water Company
Kankakee, IL

Mike Hooker
Superintendent
Garden State Water Company
Phillipsburg, NJ

Richard Subasic
Engineer
Shenango Valley Water Company
Sharon, PA

Jack Longmuir
Superintendent
Garden State Water Company
Hamilton Square, NJ

Advisory Committee

James J. Costello
Chief Filtration Engineer
South Water Filtration Plant
Chicago, IL

Edwin Geldreich, Jr.
U. S. EPA
Cincinnati, OH

Raymond H. Taylor
Water Quality Engineering Assoc.
California Water Service Company
San Jose, CA

WATER QUALITY DETERIORATION IN DISTRIBUTION SYSTEMS - University of Tennessee

Gregory D. Reed, Ph.D.
Dept. of Civil Engineering
University of Tennessee
Knoxville, TN

Mike Tucker
Head Chemist
Knoxville Utilities Board
Knoxville, TN

Advisory Committee

James J. Costello*
Raymond H. Taylor*
Edwin Geldreich, Jr.*

INSTITUTIONAL ALTERNATIVES FOR SMALL COMMUNITY WATER SYSTEMS

Robert G. McCall
Kelley, Gidley, Blair & Wolfe, Inc.
Charleston, WV

Advisory Committee

Jack Hoffbuhr
Deputy Director-Water Mgmt. Div.
U.S. EPA - Region VIII
Denver, CO

Henry J. Ongerth*

Thomas J. Sorg
Drinking Water Research Division
U.S. EPA
Cincinnati, OH

FILTRATION OF GIARDIA CYSTS UNDER TREATMENT PLANT CONDITIONS

David W. Hendricks, Ph.D.
Professor of Civil Engineering
Colorado State University
Ft. Collins, CO

Gary St. Clair
Mayor
City of Empire
Empire, CO

Ben Alexander
Superintendent, Supply & Treatment
City of Ft. Collins
Ft. Collins, CO

Advisory Committee

Richard J. Karlin*
William Liechty*
Gary Logsdon, Ph.D.*

DEVELOPMENT OF A PROTOCOL FOR THE SELECTION OF COAGULANT/FILTRATION AIDS

Steven K. Dentel, Ph.D.
College of Engineering
University of Delaware
Newark, DE

Advisory Committee

Keith E. Carns
Manager, Water Quality
East Bay Municipal Util. District
Oakland, CA

Gary Logsdon, Ph.D.*

Raymond D. Letterman, Ph.D.
Professor, Dept. of Civil Engineering
Syracuse University
Syracuse, NY

RECOVERY OF VOLATILE ORGANIC CHEMICAL VAPORS FROM AIR STRIPPING TOWERS USING GAS PHASE ADSORPTION

John C. Crittenden, Ph.D., P.E.
Department of Civil Engineering
Michigan Technological University
Houghton, MI

John Kannenberg
Mayor
Wausau Water Utility
Wausau, WI

Advisory Committee

John M. Gaston
Senior Consultant
CH2M Hill Consulting Engineers
Emeryville, CA

Benjamin Lykins, Jr.*

Alan F. Hess
Manager, Water Quality & Treatment
Malcolm Pirnie, Inc.
Paramus, NJ

STUDY THE EFFECTS OF ALTERNATING CURRENT ON THE RATE OF INTERNAL CORROSION ON COPPER WATER PIPES

Patrick J. Dugan, Jr.
Chief Chemist
Suffolk County Water Authority
Oakdale, Long Island, NY

Robert Ambrose
Corrosion Control Engineer
Long Island Lighting Company
Hicksville, NY

STATE-OF-THE-ART CORROSION REPORT WITH THE ENGLER-BUNTE INSTITUTE (GERMANY)

American Contributors

Michael R. Schock
Assistant Chemist
State Water Survey Division
Champaign, IL

J. Edward Singley, Ph.D.
Vice President
J.M. Consulting Engineers
Gainesville, FL

John F. Ferguson, Ph.D.
Dept. of Civil Engineering
University of Washington
Seattle, WA

R. Rhodes Trussell, Ph.D.
Vice President
J.M. Mongtomery Consulting Engineers
Pasadena, CA

Henry Cruse, P.E.
EMCON Associates
Glendale, CA

Robert A. Ryder, P.E.
Collins & Ryder Consulting Engineers
Larkspur, CA

Vernon Snoeyink, Ph.D.*

MONITORING OF TREATMENT PRACTICES WHICH CAN CONTRIBUTE TO BACTERIAL REGROWTH IN DISTRIBUTION SYSTEMS

W. G. Characklis, Ph.D.
Director
Institute for Biological & Chemical
Process Analysis
Montana State University

Ramon G. Lee
Director, Research & Technology
System Water Quality
American Water Works Service Company
Marlton, NJ

Fran Ludwig
Manager of Environmental Affairs
South Central CT Regional Water Auth.
New Haven, CT

Advisory Committee

Joyce S. Kippin
Microbiologist
Salem-Beverly Water Supply Board
Beverly, MA

Raymond H. Taylor*

David R. Goff
Consulting Sanitary Engineer
Consumers/Pirnie Utilities Service Co.
Hamden, CT

Edwin Geldreich, Jr.*

DISINFECTANT RESIDUAL MEASUREMENT METHODS

Gilbert Gordon, Ph.D.
Department of Chemistry
Miami University
Oxford, OH

Advisory Committee

Mark Carter, Ph.D.
Rocky Mountain Analytical Laboratory
Arvada, CO

Leown A. Moore
U. S. EPA
Cincinnati, OH

Donald Johnson, Ph.D.
Dept. of Environmental Sciences & Engrg.
University of North Carolina
Chapel Hill, NC

R. Rhodes Trussell, Ph.D.*

UNACCOUNTED-FOR WATER

Lynn P. Wallace, Ph.D., P.E.
Civil Engineering Department
Brigham Young University
Provo, UT

Rick D. Wheadon
Vice President
Community Consultants, Inc.
Springville, UT

Advisory Committee

Bruce S. Aptowicz
Water Operations Manager
Philadelphia Water Department
Philadelphia, PA

Richard G. Eilers
U. S. EPA
Cincinnati, OH

John E. Pilzer
Vice President, Dist. Services
Gary-Hobart Water Corporation
Gary, IN

REVIEW OF WATER INDUSTRY PLASTIC PIPE PRACTICES

David Jenkins, Ph.D.
College of Engineering
University of California-Berkeley
Berkeley, CA

Advisory Committee

Richard Miltner
U. S. EPA
Cincinnati, OH

Keith E. Carns*
Ramon G. Lee*

LEACHATE FROM ORGANIC COATING MATERIALS USED IN POTABLE WATER DISTRIBUTION SYSTEMS: EFFECTS OF CHLORINATION

Katherine T. Alben, Ph.D.
Research Scientist
New York State Department of Health
Albany, NY

Advisory Committee

Gordon Bellen
National Sanitation Foundation
Ann Arbor, MI

Alan A. Stevens*

R. Scott Yoo
Water Quality Manager
San Jose Water Company
San Jose, CA

SLUDGE DISPOSAL PRACTICES

David A. Cornwell, Ph.D., P.E.
President
Environmental Engineering & Tech., PC
Newport News, VA

Advisory Committee

Charles R. O'Melia, Ph.D.
Professor, Dept. of Geography &
Environmental Engineering
The Johns Hopkins University
Baltimore, MD

Steve Hathaway
U. S. EPA
Cincinnati, OH

Joseph Wandyez
Administrative Director
Erie County Water Authority
Buffalo, NY 14203

SCALE FORMATION AND INHIBITOR CHEMISTRY

Mark M. Benjamin, Ph.D.
Dept. of Civil Engineering
University of Washington
Seattle, WA

John E. Courchene
Water Quality Director
Seattle Water Department
Seattle, WA

Kenneth F. Olson
Superintendent, Water Division
Tacoma Public Utilities
Tacoma, WA

Advisory Committee

Marvin Gardels, Ph.D.
U.S. EPA
Cincinnati, OH

Steven A. Hubbs*
Gregory D. Reed, Ph.D.*

INACTIVATION OF GIARDIA CYSTS WITH CHLORINE AT TEMPERATURES BELOW 5° CELSIUS

Charles P. Hibler, Ph.D.
Department of Pathology
College of Veterinary Medicine &
Biological Science
Colorado State University
Ft. Collins, CO

Advisory Committee

Robert Champlin, Ph.D.
Professor
University of Wyoming
Laramie, WY

John Hoff
U.S. EPA
Cincinnati, OH

Jack Hoffbuhr*

POLYMERIC INORGANIC COAGULANTS

Charles R. O'Melia, Ph.D.*

Advisory Committee

Brian A. Dempsey, Ph.D.
Department of Civil Engineering
University of Missouri
Rolla, MO

Raymond D. Letterman, Ph.D.*
Alan A. Stevens*

EVALUATION OF THE SUBSTITUTION OF GRANULAR ACTIVATED CARBON MEDIA FOR CONVENTIONAL GRANULAR FILTRATION MEDIA

Vernon L. Snoeyink, Ph.D,*

Ramon G. Lee*

Advisory Committee

James M. Symons, Ph.D.
Department of Civil Engineering
University of Houston
Houston, TX

Jack DeMarco*
Benjamin Lykins, Jr.*

CONTROL OF ALUMINUM POST-PRECIPITATION

Raymond D. Letterman, Ph.D.*

Clinton R. Gay
Administrative Director
Onondaga County Metro Water Board
Clay, NY

Advisory Committee

James K. Edzwald, Ph.D.*

James J. Costello*

Steve Hathaway*

EVALUATION OF THE STREAMING CURRENT DETECTOR AS A CHEMICAL DOSE CONTROL DEVICE

Steven K. Dentel, Ph.D.*

Advisory Committee

A. Roy Fowler, III
Assistant General Manager
Cobb County Marietta Water Authority
Acworth, GA

Kim R. Fox
U. S. EPA
Cincinnati, OH

David A. Cornwell, Ph.D.*

EVALUATION OF CONTAMINATION POTENTIAL ACCOMPANYING THE ELIMINATION OF THE FILTER-TO-WASTE PROCEDURE AT FILTER PLANTS

Appiah Amirtharajah, Ph.D.
Department of Civil Engineering
Montana State University
Bozeman, MT

Richard Holmes
Director, Public Service
City of Bozeman
Bozeman, MT

Lyle Meeks
Utilities Supervisor
City of Great Falls
Great Falls, MT

Advisory Committee

Billy G. Turner
Vice President
Jordan Jones Goulding
Atlanta, GA

Richard J. Karlin*
Gary Logsdon, Ph.D.*

NATIONAL SURVEY OF PUBLIC OPINION

Stanley M. Zdep, Ph.D.
Audits and Surveys, Inc.
Government Research Division
Princeton, NJ

Advisory Committee

William H. Miller
Manager
Denver Water Department
Denver, CO

Arnold Kuzmack, Ph.D.
Office of Drinking Water
U. S. EPA
Washington, D.C.

Robert A. Gerber
President
Hackensack Water Company
Harrington Park, NJ

TASTE AND ODOR IN DRINKING WATER SUPPLIES - PHASE II

I. H. Suffet, Ph.D.*

Thomas L. Yohe*

Patrick R. Cairo*

Michael J. McGuire, Ph.D.*

Advisory Committee

John M. Gaston*

Alan A. Stevens*

Robert Hoehn, Ph.D.*

Jack Dice*

RESEARCH FOUNDATION/LYONNAISE DES EAUX (FRANCE) JOINT TASTE AND ODOR REPORT

American Contributors

I. H. Suffet, Ph.D.*

Robert Hoehn, Ph.D.*

John M. Gaston*

Thomas L. Yohe*

Michael J. McGuire, Ph.D.*

Attachment #2

UTILITIES CONTRIBUTING TO 1986 RESEARCH FOUNDATION FUND DRIVE (AND PLEDGED TO CONTRIBUTE TO 1987 FUND DRIVE)

City Calgary Waterworks Division
Calgary, AB

Anchorage Water & Wastewater Utility
Anchorage, AK

Birmingham Water Works Board
Birmingham, AL

General Wtrwrks Corp-Pine Bluff
Pine Bluff, AR

Paradise Valley Water Co
Scottsdale, AZ

Park Water Co
Downey, CA

Dominguez Water Corp
Long Beach, CA

Los Angeles Dept Water & Power
Los Angeles, CA

Metro Water District of So. Calif
Los Angeles, CA

California-American Water Co
National City, CA

Casitas Municipal Water Dist
Oak View, CA

East Bay Metro Utility District
Oakland, CA

San Bernardino Munic Water Dept
San Bernardino, CA

California Water Service Co
San Jose, CA

Tampa Water Dept
Tampa, FL

Atlanta Water Bureau
Atlanta, GA

Honolulu Board of Water Supply
Honolulu, HI

Clinton Water Works Co
Clinton, IA

San Jose Water Co
San Jose, CA

Colorado Springs Water Division
Colorado Spring, CO

Denver Water Department
Denver, CO

Bridgeport Hydraulic Co
Bridgeport, CT

Connecticut Water Service, Inc
Clinton, CT

Connecticut-American Water Co
Greenwich, CT

Hartford County Metro District
Hartford, CT

S Central CT Regional Water Auth
New Haven, CT

Wilmington Suburban Water Co
Claymont, DE

Artesian Water Co., Inc.
Wilmington, DE

Jacksonville Suburban Utility
Jacksonville, FL

General Development Utilities
Miami, FL

Orlando Utilities Commission
Orlando, FL

Florida Cities Water Co
Sarasota, FL

Louisville Water Co
Louisville, KY

Swrg & Water Board of New Orleans
New Orleans, LA

Boston Water & Sewer Commission
Boston, MA

Dedham Water Co
Dedham, MA

Davenport Water Co
Davenport, IA

Boise Water Corp
Boise, ID

Northern Ill. Wtr Corp
Champaign, IL

Dept of Water, City of Chicago
Chicago, IL

Kankakee Water Co
Kankakee, IL

Gary-Hobart Water Corp
Gary, IN

Indiana Cities Water Corp
Greenwood, IN

Indianapolis Water Co
Indianapolis, IN

Illinois-American Water Co
Richmond, IN

Indiana-American Water Co
Richmond, IN

Missouri-American Water Co
Richmond, IN

Ohio-American Water Co
Richmond, IN

Kentucky-American Water Co
Lexington, KY

St. Louis Cty Wtr Co
St. Louis, MO

St. Louis Water Div
St. Louis, MO

Orange Water & Sewer Authority
Carrboro, NC

City of Greensboro Public Wks
Greensboro, NC

Omaha Metropolitan Utilities Dist
Omaha, NE

Hampton Waterworks Co
Hampton, NH

Manchester Water Works
Manchester, NH

Hingham Water Co
Hingham, MA

Massachusetts-American Water Co
Millbury, MA

The Oxford Water Co
Millbury, MA

Wannacomet Water Co
Nantucket, MA

Maryland-American Water Co
Bel Air, MD

Washington Suburban Sanitary Comm
Hyattsville, MD

City of Bay City
Bay City, MI

Detroit Water & Sewerage Dept
Detroit, MI

Kalamazoo City Utility
Kalamazoo, MI

Wyoming Water Dept
Wyoming, MI

St. Cloud Water Utility
St. Cloud, MN

Missouri Water Co
Independence, MO

Kansas City Water Dept
Kansas City, MO

Erie County Water Authority
Buffalo, NY

Long Island Water Corp
Lynbrook, NY

New Rochelle Water Co
New Rochelle, NY

NYC Dept Environmental Protect
New York, NY

New York Water Service Corp
New York, NY

New York-American Water Co
Port Chester, NY

Onondaga County Water Authority
Syracuse, NY

Passaic Valley Water Commission
Clifton, NJ

Elizabethtown Water Co
Elizabeth, NJ

New Jersey Water Co
Haddon Heights, NJ

Salisbury Water Supply Co
Hampton, NJ

Hackensack Water Co
Harrington Park, NJ

Middlesex Water Co
Iselin, NJ

Garden State Water Co
Robbinsville, NJ

Commonwealth Water Co
Short Hills, NJ

Monmouth Consolidated Water Co
Shrewsbury, NJ

Toms River Water Co
Toms River, NJ

Western Pennsylvania Water Co
Hershey, PA

Riverton Consolidated Water Co
Lemoyne, PA

Philadelphia Water Dept
Philadelphia, PA

Fox Chapel Authority
Pittsburgh, PA

Roaring Creek Water Co
Shamokin, PA

Shenango Valley Water Co
Sharon, PA

Bristol County Water Co
Bristol, RI

Tennessee-American Water Co
Chattanooga, TN

Knoxville Utilities Board
Knoxville, TN

Memphis Light Gas & Water Div
Memphis, TN

Spring Valley Water Co
West Nyack, NY

Akron Public Utilities Bureau
Akron, OH

Cincinnati Water Works
Cincinnati, OH

Ohio Water Service Co
Poland, OH

Toledo Dept of Public Utilities
Toledo, OH

Reg Municipality Ottawa-Carleton
Ottawa, ON

Portland Bureau of Water Works
Portland, OR

Philadelphia Suburban Water Co
Bryn Mawr, PA

Dauphin Cons Water Supply Co
Harrisburg, PA

Keystone Water Co
Hershey, PA

City of Seattle Water Dept
Seattle, WA

Tacoma Dept of Public Utilities
Tacoma, WA

West Virginia Water Co
Charleston, WV

Huntington Water Corp
Huntington, WV

Nashville Dept Water & Swrg Serv
Nashville, TN

City of Arlington Water Dept
Arlington, TX

Dallas Water Utilities
Dallas, TX

Houston Dept of Public Works
Houston, TX

Virginia-American Water Co
Alexandria, VA

Fairfax County Water Authority
Merrifield, VA

Norfolk Dept of Utilities
Norfolk, VA

Attachment #3

Categorical Listing
of
Research Projects Funded
by the
AWWA Research Foundation
January 1982 through March 1986

Water Resources

● Water Reuse Symposium III - 1984

o Municipal Wastewater Reuse News

● Control of Algae in Reservoirs, Casitas Municipal Water District

Water Quality

● Identification and Treatment of Odor Producing Compounds, Phase I

o Identification and Treatment of Odor Producing Compounds, Phase II

o Lower Mississippi Screening Model Study

o Chloro-Organic Water Quality Changes as it Relates to Source Water and Treatment Practices

● Mode of Action of Combined Chlorine - Phase I

o Mode of Action of Combined Chlorine - Phase I (1986)

● Development of Protocol for Coagulant/Filtration Aids

o Leachates from Organic Coatings

Water Treatment

● Removal of Organic Chemicals from Drinking Water, AWWARF and KIWA

● Asbestos Study

o Removal of Volatile Organics from Well Waters, North Penn. Water Authority

● Manganese Treatment by Sodium Silicate and Chlorine

o Treatment Practices for Removal of Giardia Cysts

● Filtration of Giardia Cysts Under Treatment Plant Conditions

o Use of Ozone as a Preoxidant

o Recovery of VOC Vapors from Air Stripping Towers

o Granular Activated Carbon Substitution for Sand

o Control of Aluminum Precipitation

NOTE ●= : Research completed - final report completed or undergoing review by Project Advisory Committee and Staff

- o On-Line Instrumentation for Continuous Dose Control
- o Filter-to-Waste Procedures
- o Polymeric Inorganic Coagulants
- o Inactivation of *Giardia* Cysts with Chlorine at Temperatures below 5° Celsius
- o Case Studies of Current Disinfection Practices (1986)
- o Full-Scale Evaluation of Constant- versus Declining-Rate Filtration (1986)
- o Optimization and Economic Evaluation of Granular Activated Carbon for Organics Removal (1986)
- o Small System Treatment Technology (1986)
- o Critical Evaluation of Coagulant Recovery Systems (1986)

Distribution Systems

- ● Corrosion Report - "Internal Corrosion of Water Distribution Systems"
- ● Development of Realistic Replacement/Rehabilitation Criteria for Distribution System Components of Water Utilities
- o Water Quality Deterioration in Distribution Systems (two projects)
- o Monitoring Treatment Practices Which Contribute to Bacterial Regrowth
- o Unaccounted-For-Water
- o Plastic Pipe Practices
- o Corrosion Effects of Electrical Grounding
- o Scale Formation and Corrosion Inhibitor Chemistry
- o Economics of Internal Corrosion Control (1986)

Monitoring and Analysis

- o Surrogate Parameters for Operational Control
- ● Literature Search and Identification of Candidates for Future Research
- o KIWA Surrogates Report
- ● Rapid Haloform Test
- ● Organic Surrogates
- o Disinfectant Residual Measurement Methods
- ● Detection of *Giardia* Cysts by Immunofluorescence
- o Validation of the Test Procedure "The Rapid Haloform Index" (1986)
- o Rapid Detection Methods for Coliform Bacteria in Drinking Water (1986)

- o Validation of a Protocol for the Selection of Coagulant/Filtration Aids (1986)
- o Innovative Screening Techniques for Microbiological Contaminants (1986)

Miscellaneous

- • NAS Study of the Barriers to Effective Management of Urban Water Systems
- o Blood Pressure/Sodium Study
- • Barriers to the Introduction of New Water Treatment Technologies
- o Institutional Alternatives for Small Water Systems
- • Survey of Public Attitudes (1985)
- o Evaluating Performance Criteria for Residential Water Meters (1986)

Technology Transfer

- o WATERQUEST
- o Emerging Technologies - Phase I and Phase II
- o Water Research Quarterly
- o Research News

STATEMENT OF MICHAEL PACK, ON BEHALF OF THE UNDERGROUND INJECTION PRACTICES COUNCIL

Senator GARN. Next, we have a panel, Mr. James Welsh, the State of Louisiana; Mr. William Bryson, State of Kansas; Mr. William Klemt, State of Texas.

Mr. PACK. Good afternoon, Mr. Chairman.

My name is Michael Pack. I am here this afternoon behalf of Mr. Bryson, Mr. Klemt, and Mr. Welsh, of Louisiana, who could not, because of budgetary constraints, leave their respective States. They asked me to come on their behalf. That is very appropriate because of the nature of what I am about to tell you.

I do represent today those States and a number of other States, approximately 30 States, and those States belong to a group that is called the Underground Injection Practices Council. We appeared before you a year ago and we appear before you again today.

I am here to talk to you about what we feel is a developing challenge and a crisis in State ground water protection efforts. We have submitted for the record a statement, Mr. Chairman, that I will not bother to read to you. I will simply go through it, touch the highlights, and ask that the formal testimony be put into the record.

Senator GARN. It will be.

Mr. PACK. The underground ejection wells are an essential part of the oil and gas industry and the various industries in the United States of

America. There are literally hundreds of thousands of ejection wells in the United States of America. In fact, in the State of Utah, Mr. Chairman, I have a figure that tells me the most recent inventory is that there are 1,563 injection wells in the State of Utah; 665 are related to the oil and gas industry and the remainder related to other industrial concerns.

These hundreds of thousands, or approximately 225,000, wells across the country inject, again, literally billions and billions of gallons of wastewater a year into geologic formations, sometimes 2 and 3 miles beneath the surface of the Earth. To give you a comparison, if those roughly 25 billion gallons of fluid were to be placed above the District of Columbia, by example, if you were to put a dike around the District of Columbia, that would cover the District a depth of 100 feet.

So we are talking about a lot of fluid.

These injection wells are not well known by the public, and that is because they have largely operated safely for decades and decades, but this record is threatened by two new developments which are beyond our control at the State level, Mr. Chairman. The first and most important perhaps is the drastic decline in the world price of oil.

For every barrel of oil that is produced, there are approximately 40 to 50 barrels of salt water produced coincidentally with that oil, salt water brought up in the oil-bearing formations. That salt water is reinjected every day, unseen to the public, back into the formations from whence it came. It is the process of doing that safely without contaminating drinking water that we are here to talk to you about today.

The failure to inject that fluid or improper injection causes lasting damage, absolutely lasting damage to underground sources of drinking water.

With the decline in prices, it is no longer profitable to operate many of these wells, and we are concerned as States that the temporary abandonment of plugging of these wells poses as an environmental threat to underground sources of drinking water. Now, in the worst of times, as the number of wells is decreasing, Mr. Chairman, we as State regulators become more concerned because of the temptation by marginal companies to cost cut, to operate wells in ways that they might not otherwise if money was more abundant to them.

It is through our concern of these kinds of things that in the plugging of abandoned wells that we, as States, feel we should be increasing the amounts of inspections that we do out in the oil patch and in the industrial waste wells.

We, under an agreement or under mandate from the Federal Government through the Safe Drinking Water Act, try to have a field inspector present at every plugging and every abandonment of every well that gets plugged in the United States of America. These wells are tested regularly, and they are tested by field people, employees, that are working to implement a Federal program, the Safe Drinking Water Act. The States with the greatest numbers of injection wells are also those that are most adversely affected by the decline in oil prices.

It is directly related to that decline that their budgets are being reduced and they are cutting staff and they are cutting their inspection staffs. While the workload and responsibilities go up for these agencies, the budgets decrease, and we are all well aware of the State budget deficiencies as we are of the Federal budget difficulties. But our workload, Mr. Chairman, hasn't decreased. It has gotten worse, not decreased.

I have got some bad news and some good news. The bad news is that we have got a history of pollution in the United States that isn't good. There is no point in dismissing it. In the past, there have been incidents of gound water contamination by salt water pits, by improper underground injection, and the record of the early twenties, thirties, and forties isn't particularly good.

The good news is that since the passage of the Safe Drinking Water Act in 1976 by the Congress and through strict enforcement by the U.S. EPA and the States, we have changed all that. The record is excellent. The Underground Injection Practices Council just completed a study which shows that the record for hazardous waste disposal in the United States since the passage of the Safe Drinking Water Act is just excellent, absolutely excellent.

But that is not by accident. That is because we have had the inspectors and the money to regulate and inspect both classes of wells.

A second challenge that faces us is the increased use of underground injection of hazardous waste materials. Given new environmental legislation ranging from Superfund and the Resource Conservation Recovery Act, the methods of waste disposal have been greatly restricted in this country. It is our opinion that there is a growing dependency upon underground injection of hazardous wastes in States where it is an appropriate way to dispose of that material.

With this increased use of hazardous waste disposal wells, there is increased requirements for monitoring and inspection of those wells. At the same time, we have got declining State budgets and declining State staffers to implement this Federal program.

These wells have operated safely over the years, and as a best example, I will tell you that in Victoria, TX, there is a well that has been operating for 33 years. It is the longest operating class 1 hazardous waste disposal well in the United States. It has been injecting 17 billion gallons of waste a year for 33 years without incident. I wish we could have a mayor of Victoria, TX, with us today. We approached him. He wasn't able to make it to tell us Victoria would very, very much like to keep that well in place and the company that runs it.

I might tell you, next to that well and associated with that well are public, not public water supply wells, but water supply wells immediately next to that hazardous waste well, showing that the two can be done compatibly side by side. This excellent safety record didn't happen by accident.

I have said it is the result of the Congress passing the Safe Drinking Water Act, the EPA producing rules and regulations, and the willingness of the States, the State of Utah among them, to accept primacy and responsibility among them for implementing a Federal program.

Your committee has historically supported the cost of running this program, Mr. Chairman. I would hope it would continue to do so in the coming years. But this relationship is being threatened this year, more severely than it ever has before. That is because the States aren't able to come up with their match and their personnel to implement this program.

I am talking about field inspectors, geologists, engineers, and the people that are out in the field officially witnessing the test far removed from Washington, DC, and far removed from the State capitals, the folks with the blue jeans and the boots on that are out in the field reading the gauges and filling in the reports and letting us know it has all been done correctly. These are the people I am talking about. I am not talking about office personnel; I am talking about field personnel doing the inspections.

We are talking about a threat to the inspection program due to lack of funding. These people are, without question, the most important link in the environmental chain of protection. It begins here in Washington, DC, and ends up out in the fields of the United States of America.

Without additional funding, States will be laying off people and have already, in fact, begun laying off people that are part of this program. There is no effective program without these people. These people are the bottom line in inspections.

The EPA, we don't feel, can turn around and implement the program that costs less in the State of Utah or the State of Oklahoma can. I would be hard pressed to tell you that the Federal Government can come in and retire that many people and begin implementing its own program without a serious lapse in inspections and would really have no alternative to helping the States meet their continuing commitment.

In this regard, we are asking you to help us continue this cooperative agreement. We are asking you to help the States continue to implement a Federal program, and we are asking this committee to consider an increase of 2.5 million to the existing EPA State grant funding program.

We know what happens when injection isn't carried out correctly. We know what happens through history, which has taught us what happens when it is done improperly and illegally. We know what the good results have been since 1976 and before that when States were running good programs. What we are asking you is to help us keep this program going in these United States and to help the States carry out this federally mandated program.

Thank you. Any questions?

Senator GARN. Thank you very much.

[The statement follows:]

STATEMENT OF MICHAEL PACK, ON BEHALF OF THE UNDERGROUND INJECTION PRACTICES COUNCIL

Mr. Chairman, I am James Welsh representing the state of Louisiana Department of Natural Resources, Office of Conservation. With me are Mr. William Bryson of the State of Kansas and Mr. William Klemt of the State of Texas. We are appearing in our capacity as board members of the Underground Injection Practices Council to call your attention to a developing challenge and crisis in state groundwater protection efforts.

This is the challenge of ensuring the continued safe operation of underground injection wells which are an essential part of the operation of the oil, chemical and manufacturing industries. There are hundreds of thousands of these wells nationwide which inject billions of gallons of wastewater each year. Despite the magnitude of these numbers, injection wells have been operated with a very high degree of safety for many decades. Now this record is threatened by two new developments which are beyond our control at the state level.

First is the drastic decline which we are experiencing in the price of oil. Let me briefly describe how this threatens our groundwater resources. Every barrel of oil which is produced is accompanied by as many as 40 or 50 barrels of salt water. This salt water is extracted from oil bearing strata and brought to the surface along with the oil. It must then be carefully reinjected below the groundwater table. Failure to inject or improper injection causes severe and lasting damage to the environment and underground drinking water supplies.

Now, with the decline in the price of petroleum, many oil wells are no longer profitable and have been shut down. But an inoperative well can still do serious damage to the environment. Under law, well operators have two options. They must either file for temporary abandonment or plug their wells and furnish the appropriate regulatory agency with evidence that the well has maintained its mechanical integrity. Either way, our workload at the state regulatory agencies has dramatically increased and will continue to do so. This is because we try to have a field inspector present to observe tests of integrity concerning operation of a well. In cases of a temporary abandonment, our geologists and engineers must carefully review and either approve or reject the evidence demonstrating the mechanical integrity of a given well.

Unfortunately, the states with the greatest number of injection wells are the same states whose tax revenues have been most adversely affected by the decline in oil prices. We have also been affected by increased reporting requirements to the EPA and significantly more administrative paperwork not to mention the federal budget crisis. The result has been that while our workload and responsibilities have been substantially increasing, our budget has been decreasing.

It is difficult to describe in words the potential damage which can be caused by improper salt water disposal in the oil fields. These are unseen problems which can be prevented by proper inspections by the states. Such pollution was not uncommon in the past in oil producing states. Most all of this damage was done in the early 1930's and has all but ended due to actions taken by Congress and most importantly the Safe Drinking Water Act. The states are encouraged by the USEPA to implement the strict enforcement programs which have been in place for the past 10 years.

Thanks to these environmental laws and the federal/state enforcement programs that have been brought into effect over the past few years, a great deal of preventive improvement has been realized. However, with oil prices falling, oil wells being abandoned, and operators being forced into bankruptcy, the number of inoperative and abandoned wells is growing dramatically. If we are to continue with our highly successful record of protecting the environment we must be able to maintain adequate staffs who have the expertise to identify potential problems that prevent degradation of groundwater quality.

The second challenge which we face comes from a different type of well which injects hazardous waste. Many industries depend upon these wells to dispose of many of the by-products of their manufacturing processes. New environmental legislation ranging from Superfund, to the Resource, Conservation and Recovery Act greatly restrict previously available options of waste disposal. Injection wells are now the principal means of safe waste disposal. They represent the safest and most economical method available today. This growing use of these waste disposal wells will also increase our responsibility of certifying that these wells can and will be operated in a manner which does not threaten the environment.

The improper injection of industrial wastes can cause groundwater contamination. We know that from a few well publicized but isolated examples from around the country. In contrast, the vast majority of these type injection wells have been operated with complete safety; some for more than 30 years. For example, one plant, in Victoria, Texas, has injected 17 billion gallons of waste water a year for the past 33 years without incident or damage to the environment. Another example may be seen in the more than two dozen industrial facilities between Baton Rouge and New Orleans which use injection wells to dispose of their waste water while ensuring that they do not damage drinking water.

Mr. Chairman, the excellent safety record which has been developed over the past decade with regard to all types of injection wells did not just happen by accident. Instead, it is the result of a cooperative venture which has developed among the Congress, the US EPA, and state regulatory agencies. Congress has passed environmental and water protection laws. Federal agencies have developed regulations from these laws. State regulatory agencies have applied for and received primacy to administer this federal program for the US EPA. Your Committee has historically funded a portion of the cost of running this federal program while state governments pay for the balance.

Now this relationship is threatened at its most vulnerable point. We must maintain an adequate level of funding to preserve the backbone of our programs which is field inspectors, geologists, and engineers. They are the people who officially wittness the plugging of an oil well, or who monitor industrial injection well sites thereby helping to insure its continuous safe operation. We depend upon our professional staff to review applications for new injection wells, for permission to plug old wells, and to ensure the mechanical integrity of all injection wells including those that have been temporarily shut down. These people are the most important link in the chain of environmental protection that runs from the Congress down to the state district level and ensures the safe operation of all injection wells. Without additional funding, most states have either begun, or will soon, be laying off these vital professionals. No effective program can exist without these people out in the field where the wells are. But this takes resources, and resources are becoming scarce. A real problem now exists.

We appeal to you today to help us continue this successful partnership. With an increase of 2.5 million dollars over the request for EPA UIC State Grant Funding, we could not only preserve our operations at the current level but also allow for an appropriate number of field inspectors, geologists, and engineers to carryout our increased program needs. This will be crucial in helping us to meet the increased demands brought about by the decline in oil prices and the increase in federal environmental regulations. States will continue to do their part by paying for more than their required percentage of this federal program. In most states, industry also helps to pay for regulatory programs through injection taxes.

We know what happens when injection is carried out in an improper or an illegal manner. We also know the good results produced by carefully regulated and monitored injection. We are trying to do our best at carrying out the concerns the Congress had when they passed the Safe Drinking Water Act. We appeal to the Committee to assist us in keeping the tools to maintain the current program to protect the nation's groundwater resources. Thank you very much. We would be happy to answer any questions.

STATEMENT OF A. DAVID LESTER, EXECUTIVE DIRECTOR, COUNCIL OF ENERGY RESOURCE TRIBES

Senator GARN. Next is Mr. A. David Lester, executive director of the Council of Energy Resource Tribes?

Mr. LESTER. Thank you, Mr. Chairman, for the opportunity to present testimony on behalf of 42 Indian tribes who comprise the governing body of the Council of Energy Resource Tribes. CERT, as it is commonly called, was created by the tribes to assist them in the prudent development of their natural resources leading to a valid, stable, diversified economy. Among the objectives laid out by the organizing tribes and directed now by the tribes that comprise the organization is a commitment to the environmental protection on Indian lands, and our testimony today is directed at the EPA appropriations.

As you know, environmental protection within the Indian culture is an end in and of itself. It is a highly valued social good in which we view each succeeding generation as part of the legacy and part of the heritage that is handed to the next.

With the increased development of natural resources, environmental protection for Indian tribes means that we must go beyond those practices that were developed within Indian culture, and we now look to the assistance from the EPA in implementing technologically based resource protection management. EPA, to our gratification, is becoming an effective partner in working with tribes to assure that the development taking place on their lands is done in an environmentally sound and prudent manner.

We also applaud the approach that they are taking with respect to implementation of their policy and the involvement of Indian tribes in a number of initiatives that they have begun. One important initiative is the Pilot Project Program, which they began funding on a pilot project basis of tribes to set up environmental management and monitoring programs within the existing statutes administered by EPA.

They have also begun to provide technical assistance to Indian tribes to identify and to assist tribes to begin to conceptualize the proper approach to environmental protection. While we are pleased with the direction they are going, we do believe that they are not going as quickly as they should. As you know, Indian lands in the United States comprise roughly 3 percent of the land base. Out West, the percentage is much greater. In some States, like in the State of Arizona, for example, more than 25 percent of the land base in Arizona is Indian land. Other States like Montana, Idaho, or Utah, where you are from, have considerable amounts of Indian lands.

What we are here to seek from the committee is not necessarily an increase that is earmarked for Indian tribes. What we are asking you to do is to consider that Indian lands as part of the land base of the United States is important not only for the protection of the environment for the Indian residents and future generations who occupy that land, but for non-Indian neighbors, as well. It is impossible, as you know, to protect one parcel of land and then leave one other parcel of land unprotected.

What we are looking for is equity in the manner in which EPA distributes the resources that are provided for the protection of the environment for all Americans and all American land, Indian and non-Indian alike. Less than 1 percent of the resources of EPA are now directed toward the protection of the Indian environmental resources.

Just on a land-based equity, we would expect something in the neighborhood of 3 percent. This year, we are seeking direct support from your committee to instruct the EPA to provide $10 million to increase their pilot projects and to complete the inventory of Indian lands so that we are dealing with a solid data base and extricating priorities and in dealing with priority problems that exist, and for those Indian lands which still remain in a pristine condition, we obviously have a great interest in keeping that environment clean and safe as we begin to develop our natural resources and our economic base.

We do not see that the environmental protection and the creation of jobs in a viable economy as two conflicting goals. We believe with the proper resources and the proper planning, we can accomplish a reasonable progress in both areas.

We also would like EPA to expend about $5 million this year in technical assistance to tribes in increasing their own capability. Inasmuch as some of the laws do not yet provide for full delegation of authority from EPA to Indian tribal government, the protection of Indian resources must still occur. And we believe that to lie with a Federal capability to assist Indian tribes in carrying out the intent of environmental protection laws.

It seems to us that the more that all of us as Americans learn about the importance of the environment as we build an economic base and stay competitive in world economics, the Indian view, the long view, is one which seems to be gaining more and more acceptance, and that is, while we may, from each generation, claim an ownership to the land in a real sense, the land does not belong to us.

We belong to the land, and it is a duty that we carry to pass along to our future generations a safe and clean environment as well as jobs and economic stability. This is what we are seeking from the EPA as a chance to do a good job as we move forward.

Thank you very much for the opportunity to be with you, Mr. Garn.

Senator GARN. Thank you for coming today.

[The statement follows:]

STATEMENT OF DAVID LESTER, EXECUTIVE DIRECTOR, COUNCIL OF ENERGY RESOURCE TRIBES

Mr. Chairman, distinguished Committee members, my name is David Lester, Executive Director of the Council of Energy Resource Tribes (CERT). CERT welcomes this opportunity to share our views with you on the Administration's FY 1987 budget and programs of the Environmental Protection Agency (EPA).

The Council of Energy Resource Tribes is a multitribal organization of 42 tribes who collectively represent nearly half of all American Indians living on or near reservations and account for some 51,000 square miles of tribal lands; about 60% of all reservation lands in the country. These lands contain 700 million barrels and 5,000 billion cubic feet of proven oil and gas reserves, respectively, which represents approximately 7% of total national on-shore reserves. The tribes also own 30 billion tons of recoverable coal which is about one-third of the recoverable coal in the west; and tribal lands contain half of the nation's privately owned uranium reserves. Additionally, they possess significant hydroelectric and geothermal potential along with substantial quantities of shale oil and tar sands deposits. This acreage sustains 10,000 full-time jobs and produces the equivalent of 364,000 barrels in oil, gas and coal production, thereby contributing to the nation's balance of trade as well by displacing that amount in imports.

It is important to note that these lands under development by our member tribes are also lands that present a special challenge to the governing bodies of reservation Indians. As the first environmentalists known to this country, Indian people are conscious of the need to balance the development of natural resources with the protection of the environment. The 42 governments which comprise the Council of Energy Resource Tribes have established protection of their natural environment as a major mission. Subsequently, the CERT staff has compiled substantial experience with tribal environmental issues and has maintained a longstanding professional relationship with the Environmental Protection Agency.

CERT tribes are jointly committed to a program of balanced, environmentally responsible, tribally managed reservation resource protection and development. CERT members believe that energy and natural resource development must occur within and contribute to their own tribally developed frameworks for long-term economic and social development and environmental protection.

We, at CERT, know that all life, including our own, is composed of three natural elements: land, water, and air. The harmony of these three elements is crucial to the cultural, spiritual, aesthetic, physical, and economic health of the tribes that live on America's reservations.

In this regard, we note that this Committee last year expressed its desire to see that EPA conduct a national environmental audit to identify major problem areas and make recommendations concerning reclamation, cleanup, and mediation where necessary. Our member tribes applauded this recommendation and we repeat today our concern that numerous national surveys of land use, economic, and environemntal issues have virtually neglected Indian reservations. We request this committee to urge EPA to undertake this study and to insure that in its conduct the environmental issues problems and opportunities of Indian reservations are not overlooked.

For CERT tribes, then, the protection of the environment takes on a special meaning, as the value of the environment must be measured in cultural and spiritual terms as well as in economic terms. Put most simply, preservation of the environment is for all CERT tribes an end in itself. These tribal environmental values will require equally unique and flexible protection mechanisms.

It is, therefore, no surprise that we welcome the precedent-setting EPA Indian Policy. It is the only agency of the federal government that is actively and aggressively attempting to implement not only the letter but the spirit as well of the President's Indian policy. Not only has EPA been a team player in carrying out President Reagan's Indian policy decision, but it has acknowledged and welcomed the input of tribal governments in making decisions and managing environmental programs affecting reservation lands.

We especially applaud EPA's commitment initiated in 1985 to gain an environmental experience base by developing pilot projects on several reservation lands. The pilot projects are particularly important not only to the tribes directly involved, but to all

Indian tribes as we work together to develop and/or enhance tribal institutional capability to implement environmental protection programs on reservation lands.

The results of these projects, which entail such activities as developing solid and hazardous waste management programs and ensuring air quality compliance, will serve as valuable guides as EPA charts its course in the months ahead.

To further serve that purpose, EPA has issued a plan for implementing its Indian policy. We are working closely with EPA on its proposed strategy, but we can say that the overall approach suggested is precisely the approach we have spent years trying to establish in other federal agencies. We especially appreciate the importance EPA has attached to tribal involvement; the outreach efforts; the importance of technical assistance; and the ultimate objective of tribal management and control of environmental protection programs on reservations.

In general, the interim strategy is a strong statement of EPA's support of federal Indian policy and tribal self-determination. The provisions of the interim strategy support the the federal Indian trust relationship in the framework of the policy of tribal self-determination and self-government program. The strategy includes affirmative steps to enhance tribal capacity to administer environmental programs and to communicate regularly with Indian tribes and organizations as further policies and legislation are developed.

We also appreciate EPA's recognition of the need for legislation to provide the opportunity for tribal direction and control of environmental protection on their reservations, and CERT member tribes look forward to working with EPA and the Congress on those issues. This, in fact, remains the principal concern of the 42 tribes that comprise the governing body of CERT; namely, as the President himself has said that the control and direction of these programs appropriately lies with "those governments closest to the people served."

In this regard, we urge this Committee to encourage EPA to continue with the program of pilot projects on reservations in order that all tribes can continue to profit from the experiences gained from this agency-tribal cooperation. And we request that the

Committee encourage EPA to undertake an initiative in consultation with our tribes, to develop the necessary legislation which EPA acknowledges is needed to provide clearly the statutory authority necessary for tribal control and direction of reservation environmental protection programs.

Overall, we see in the resulting evolution of tribal environmental management, that tribes will be tailoring environmental standards that adequately protect the interests of the tribes. However, our tribes fully recognize their responsibility to work in cooperation with their neighbors and the federal government in the development and enforcement of such standards. This is inherent in all environmental laws. Simply stated, our tribes seek only an equitable opportunity under these laws to work with EPA, the states, and others as partners in the common mission of managing scarce and important environmental resources.

In order for this opportunity to arise, we believe that this committee must direct EPA to be mindful that the states do not have the requisite jurisdiction nor should they have, to control and direct environmental protection activities on reservation lands. Our tribes have the manpower, and in many instances the technical expertise, to direct these programs. EPA does not have, however, under existing legislation clear authority to delegate the administration of these programs to our tribes. EPA is nevertheless, charged with insuring that the nation's environmental laws and policies are applied effectively to all lands in the United States. In this situation and until necessary legislation is enacted, it is thus perfectly clear that the administration of these programs on reservation lands must lie with EPA itself.

We therefore respectfully request this Committee to direct the environemntal protection agency to devote sufficient fiscal and personal resources to the administration of environmental protection activities on our reservation lands to ensure that our reservation environments receive at least proportionate benefits of the envirormental laws and policies which the congress has enacted for all lands and waters of the United States.

The alternative can only be that our reservations will become the nation's environmental sacrifice areas. Without the necessary effort to protect reservation lands, this will be true even of our presently relatively pristine reservation environments.

Senator GARN. Next is Susan Harjo here?

Mr. LESTER. She supports fully what I said. [Laughter.]

Senator GARN. Mr. Clark Wallace, who was to appear later, is not able to be here. He represents the National Association of Realtors. His entire statement will be placed in the record, however, as if he had been here.

[The statement follows:]

STATEMENT OF CLARK E. WALLACE, PRESIDENT, NATIONAL ASSOCIATION OF REALTORS

INTRODUCTION

Mr. Chairman, my name is Clark E. Wallace. I am a REALTOR® from Moraga, California and the President of the NATIONAL ASSOCIATION OF REALTORS®. On behalf of the more than 700,000 members of our ASSOCIATION, I want to thank you and the members of your subcommittee for the opportunity to present our views on housing appropriations legislation.

FEDERAL HOUSING AND SECONDARY MORTGAGE MARKET PROGRAMS

As you may know, Mr. Chairman, the NATIONAL ASSOCIATION OF REALTORS® represents real estate professionals whose business activities depend upon the availability of an affordable supply of mortgage capital. Although the majority of loans originated take place on a conventional basis, federal insuring and guaranteeing housing program loans, FHA and VA, comprise approximately 20 to 30 percent of the mortgage market, and thus, are an important financing tool for low- and moderate-income families.

We continue to be concerned about the number of proposals which have been advanced which would weaken the ability of FHA and VA, as well as the secondary mortgage market entities, to provide alternative financing for those who would otherwise be unable to secure conventional financing. At our January Mid-Winter Business Meetings, our Board of Directors adopted a strong position in opposition to any proposals which would weaken or privatize federal housing programs.

- "User Fees"

As such, we strongly oppose the Administration's proposal to increase or impose so-called "user fees" on FHA, VA, Fannie Mae, Ginnie Mae, and Freddie Mac. We see the proposal to increase or impose these "user fees" on housing credit programs as a tax on the homebuying public--particularly those of low and moderate income.

- **FHA Privatization**

The Administration is proposing to sell to the private sector many existing programs as part of its budget package for 1987. FHA is one of the programs chosen for sale. The Administration's proposal is based on the following:

1. It is necessary to shrink the size of government by turning over those programs which do not need government involvement.
2. There are programs which can be more efficiently operated by the private sector.
3. Selling government programs will generate funds for the federal government, thus reducing the federal deficit.

We have many questions in response to the Administration's rationale for selling FHA. Key is whether essentials like food, medical care and shelter should ever really be abandoned by the government, and whether private resources can truly be an adequate substitute for certain programs like FHA.

We understand that HUD staff is to complete a study this year on the manner in which FHA is to be privatized--that is, "how" to do it, not "whether" to do it. We understand that HUD intends to solicit the comments and concerns of those segments of the housing industry involved in the program, such as REALTORS® who initiate the majority of loans processed through FHA. We think that this is an essential step in the process of determining the future of FHA, and we encourage this effort.

We want to be assured that a newly-privatized FHA will continue the current FHA policies necessary for assuring that low- and moderate-income homebuyers are served.

We also hope that any dialogue will consider the effect that the sale of FHA assets and liabilities will have on existing Ginnie Mae mortgage-backed securities. Many people who have invested in "Ginnie Maes" need to be assured that the government will protect their investment.

The Administration plans to sell FHA for $3 billion. FHA's major asset is its defaulted properties. It is conceivable that the "book value" of these properties may not be realized and, therefore, the net worth of FHA may not near the $3 billion figure. In addition, FHA's existing treasury borrowings would be liquidated with available FHA assets, and it is a matter of conjecture what FHA's net worth would be at that point.

Based on these concerns, Mr. Chairman, we must oppose the Administration's proposal to sell FHA to the private sector.

- Other Budget Proposals

Although the Administration's privatization proposal for FHA has not been focused upon by the appropriate Congressional bodies, we continue to see the Administration "chip away" at FHA through its other budget proposals.

The Administration's proposal to eliminate the current provisions in law allowing financing of the upfront mortgage insurance premium (MIP) and closing costs as part of the mortgage, would dramatically increase the amount of upfront costs that low- and moderate-income families would need to purchase an existing or new home. Along with the proposed increase in the MIP from the current 3.8 percent to 5 percent, data we have reviewed indicate that the amount of cash the average FHA buyer (loan amount of $59,500) would need at settlement could exceed $8,000, an increase of 50 percent from the current average cash at settlement of less than $4,000.

We want to ensure that FHA continues to be available to all segments of the homebuying public, and, therefore, the proposal to establish a gross income limitation of 40,000 on FHA borrowers runs counter to this philosophy. According to the Department of Housing and Urban Development, the proposal to establish a gross income limitation of $40,000 on FHA borrowers is estimated to eliminate over one-third of the program's participants.

The Adminstration also proposes increasing the current 1 percent VA home loan guarantee fee to 3.8 percent, which we understand, will increase the amount of fees required of the veteran from about $625 to over $2,380 based on a loan amount of $62,000. While we are mindful of the need to improve the financial stability of VA loan guarantee revolving fund, Mr. Chairman, we believe that the increased loan guarantee fee will likely jeopardize the future participation of many veterans in this program. Veterans who are financially able may pursue other conventional loan alternatives. However, those veterans without the financial means to afford the increased loan guaranty fee will be forced to forego the possibility of homeownership--a benefit they were guaranteed as part of their service on behalf of this country.

Furthermore, Mr. Chairman, we believe, and have previously testified in favor of other changes that the Veterans Administration's Loan Guaranty Program can make to reduce the threat of foreclosures and resulting VA inventoried properties which put a strain on the revolving fund. In brief, we have recommended that the VA tighten its underwriting standards, alter its default and foreclosure procedures, and increase its efforts to market and sell its inventoried properties. With regard to the latter suggestion, the NATIONAL ASSOCIATION OF REALTORS® has been participating with VA and FHA to assist its field offices to market and dispose of their foreclosed properties. Many of the changes we have referred to are pending in S. 1887, a bill fashioned by the Senate Veterans Affairs Committee.

Finally, the Administration's 1987 budget proposals include imposition of or change in fees on the secondary mortgage market entities, Fannie Mae, Freddie Mac, and Ginnie Mae. The net effect of these "taxes," because that is exactly what they are, will be to increase the cost of homebuying, likely as much as a 50 basis points increase in the mortgage rate, as well as an increase in the number of points required at closing.

Mr. Chairman, as we said in our February letter to the Chairmen of the Senate and Housing Banking Committees, it is time that the appropriate Congressional committees debate the issue of government housing policy, as opposed to dealing with it in a "piecemeal basis." That is what Congress and the Administration have done for the past two to three years with various budget proposals which, by their substance, amend, without Congressional debate, the role of the government in housing. We are willing to participate in that broad debate, and believe that it will provide the proper forum for this issue.

FHA AND GNMA CREDIT AUTHORITY

As you know, mortgage interest rates are currently at the lowest level they have been in six years, and this has caused a record number of home purchases and mortgage refinancings. These unprecedented demands for housing credit have exhausted the GNMA credit authority and are already raising serious concerns about the sufficiency of the FHA insuring authority level.

- GNMA Credit Authority

On Friday, April 4, Ginnie Mae exhausted its $65.3 billion guarantee level and is no longer able to guarantee the timely payment of principal and interest to investors of securities backed by FHA, VA, and FmHA mortgages. The situation will worsen when FHA depletes its insuring authority predicted by the middle of May.

Already the secondary mortgage market is beginning to adjust to the absence of Ginnie Mae, but not without a price. Lenders who were able to purchase Ginnie Mae "reserved commitments" before its authority ran out are rumored to be offering, at a price, these "commitments" to other lenders. Fannie Mae and Freddie Mac have offered to temporarily step in and aid lenders to securitize their current FHA and VA mortgages. However, this situation is likely to involve a higher priced transaction than is normal under the mortgage-backed securities program.

This price increase will soon "rear its ugly head" in the mortgage marketplace, particularly as the number of "reserved commitments" are depleted. The bottom line will be higher mortgage interest rates and points. In addition, Mr. Chairman, this situation is causing and will continue to cause confusion and chaos in the marketplace, and unfortunately, at a point in our economy when so many families are finally able to purchase a home due to lower mortgage rates.

We urge you and your members to seek and support legislation to correct this situation by increasing Ginnie Mae's guarantee authority to a level approximating $125 billion. If no action is taken by Congress soon, we will face a critical situation where FHA and VA borrowers will not be served--all at the time of FHA and VA's highest demand in seven years.

- FHA Credit Authority

As you know, FHA is also projected to deplete its insuring authority by mid- to late May. We urge you to take similar action to increase FHA's insuring authority before homebuyers are denied access. Mr. Chairman, I want to point out that an economic analysis of regional impacts of the depletion of FHA's insurance authority is outlined in the ADDENDUM to our testimony.

FY 1987 CREDIT AUTHORITY

- FHA

We also want to mention the issue of FHA's insurance authority for FY1987. The Administration has requested lowering the FHA insuring authority to $50.9 billion for FY1987. As we can see from the healthy activity this year, FHA's authority should be adequately increased to assure a stable market. We stress the fact that increasing the authority of FHA to insure residential mortgages creates a positive "ripple effect" on the entire economy and does not add to the deficit problem.

- GNMA

The Subcommittee also needs to consider GNMA's guarantee authority for next fiscal year. As you know, the Administration has recommended $68.25 billion for FY1987. It will be important for this Subcommittee to provide a greater authority level. Because of the soundness of the GNMA program and the surpluses it realizes, it does no damage to the goals of Gramm/Rudman/Hollings. In fact, it eases the pressure on deficit financing.

CONCLUSION

Thank you for providing me this opportunity to present the views of the NATIONAL ASSOCIATION OF REALTORS®. At this time, I will be pleased to answer any questions.

ADDENDUM

ANALYSIS OF THE GNP IMPACT OF THE LOSS OF FHA INSURANCE AUTHORITY ON THE SALE OF NEW AND EXISTING HOMES AND REFINANCES

This analysis estimates the number of homebuyers who would not buy new and existing homes if FHA-insurance authority were to expire by the end of May 1986. The basis of the analysis methodology is to estimate, based on FHA data for the five months of FY86, the demand for the number of insured loans in FY86.

In a cut-off of FHA loan underwriting authority, many FHA borrowers would not be able to qualify for conventional financing; new home sales and resales to these borrowers would not take place. As a consequence, the lack of income generated from these potential transactions represents a loss of GNP to the economy as a whole. The regional impact of this loss can be determined based on the number of FHA financed new homes and existing homes that would have been insured in each region. (SEE TABLE 1, PAGE f)

a. Recent FHA Insured Cases

In FY85, the FHA single-family programs (virtually all through Section 203(b)) insured approximately 441,380 cases based on field office reports (SEE TABLE 2, PAGE j). From October 1984 through February 1985, 144,895 cases were insured. This figure represents 32.83 percent of the years total. Current figures for FY86 (through February 1986) indicate that 297,541 cases have been insured. Assuming this figure will represent the same percentage of all FY86 cases, the total caseload demand for FHA in FY1986 can be estimated at approximately 906,371 cases.

Currently, it is estimated that FHA will run out of insuring authority by the end of May. Based on FY85 experience, insured cases from the period June through September accounted for 40.5 percent of total single-family FHA loans insured. Applying this figure to our estimate for FY86 insurance demand suggests that 367,080 possible FHA cases could be affected by the cut-off of FHA authority. Clearly, some of these cases will switch to conventional financing and, hence, will not ultimately be affected by the loss of FHA authority. However, many other FHA borrowers will not be able to purchase their homes at all because the conventional market will not provide financing.

b. Estimate of FHA Fallout

The recent tightening of conventional underwriting, formally implemented by FNMA last October, suggests that FHA borrowers with loan-to-value ratios (LTVs) of 90 percent or higher would be the most adversely affected group. Consequently, those who have to use FHA to borrow at LTVs of 90 percent or above would probably be unable to secure conventional financing. Recent FHA reports for the third quarter of 1985 indicate that Section 203 (b) LTVs of 90 percent or above account for approximately 58 percent of FHA cases, and account for an even higher percentage for the other programs such as Sections 221, 223, 244, 265 and 270. We will assume that approximately 60 percent of Section 203 (b) FHA cases would be lost and unable to find conventional financing. (The NATIONAL ASSOCIATION OF REALTORS'® Residential Mortgage Finance Panel also indicates that 60 percent of FHA loans in 1985 had LTVs of 90 percent or higher).

c. Estimate of New and Existing FHA Cases

FHA data and staff estimates suggest that approximately 15 percent of current (and 1985) insured cases are new construction, with 85 percent representing existing housing cases. This figure will be used to determine the number of new homes which will not be sold if FHA insurance authority is cut off.

d. Estimate of Refinancing Percent on Existing Homes

The most recent figures for refinancing indicate that for March 1986, 30 percent of existing loans are for refinances (SEE TABLE 3 PAGE k). For FY86, the average of the first 6 months is about 19.5 percent. For FY85, refinances averaged 13.4 percent. Clearly, FY86 is seeing a considerably higher volume of refinances than FY85. A figure of 25 percent will be assumed to be the average for the remainder of FY86, primarily because loan backlogs will probably not allow the recent monthly rate of 30 percent to be maintained over the remainder of the fiscal year.

e. Computation of the Base Case Loan Loss Estimates

The estimates of GNP impacts are computed on the assumption that there will be approximately 906,371 total insured single-family dwellings under the FHA programs (primarily Section 203(b)) in FY 1986 (SEE FIGURE 1, PAGE 1).

Assuming, as in FY 1985, 40.5 percent of these cases occur in June through September, a total of 367,080 cases are at risk in the event of a post-May cut-off of FHA authority. However, since the FY86 caseload volume has been running at considerably higher absolute levels than in FY85, it is possible that the number of cases could exceed 1 million with possibly 400,000 or more at risk after the hypothetical May cut-off.

From the caseload volume assumptions given above, and that 60 percent of all FHA borrowers would not find conventional financing for either their new or existing home, approximately 220,248 cases of both new and existing homes would be lost. The fact that about 60 percent of FHA borrowers have LTVs of 90 percent or higher is in Table 4 (SEE PAGE m). These data for the third quarter 1985 are the most recent available. New and existing Section 203(b) programs for the third quarter 1985 had average loan to value ratios of 89.12 and 89.58, respectively and median LTVs exceeded 90 percent (SEE TABLE 4, PAGE m). Only Section 244 (existing), Section 265 (new), and Section 270 existing had lower average LTVs. Only Section 244 (existing) and Section 265 (new) had median LTVs below 90.

Assuming the 60 percent loss figure holds for both new and existing property types, the further assumption that 15 percent of FHA single-family cases are new properties dictates that 33,037 new homes and 187,211 existing homes would not be sold. Furthermore, assuming that 25 percent of the existing units are refinances, approximately 46,803 units which would have been refinanced would not be. This refinancing activity clearly generates significant income flows for the mortgage lending industry and the economy.

f. The GNP Losses

Analysts at the NATIONAL ASSOCIATION OF REALTORS® have estimated the impact of a 1986 resale or new home sale on the GNP. These estimates (SEE TABLE 5, PAGE n "Contribution of Single-Family Resales and New Construction of GNP" and the following section on the methodology to derive the figure: Estimating the Contribution of Resal and New Homes to GNP"), are based on the relationship of national construction expenditures, and expenditures made by home sellers and homebuyers before and after each home sale to the number of homes sold and annual GNP. These expenditures have a multiplier effect on the entire economy, therefore, the total monetary effect on the national economy or a region of the country is substantial.

For 1986, our economists have calculated that the annual contribution to GNP from the sale of an existing home (resale) will equal $18,620. The contribution from the sale of a new home will equal $112,617. Part of the contribution to GNP from the sale of an existing home include net income to lenders financing the transaction. This figure will be used for estimating GNP generated from refinancing transactions. This figure is estimated to equal $825 ($550 plus a pro-rated portion of the multiplier effect) (SEE TABLE 6, PAGE o).

However, the losses in FHA homes will be assumed to be proportional to the third quarter 1985 average price of Section 203 (b) FHA home relative to the projected average price of all homes for 1986 (SEE TABLE 6, PAGE o, Estimates of GNP Impacts). These figures for the third quarter of 1985 will be used since they are the most recent estimates of FHA home prices available. However, they will probably underestimate the prices of FHA homes in 1986 (remainder of FY1986). Since FHA homes tend to be less expensive, this assumes construction, sales, and resale expenses are proportional to the sales price of the home. Since an FHA existing home is approximately 61.03 percent of the projected 1986 average home price, the impact of the loss of an FHA existing home sale will be estimated at $11,363. Since a refinancing is for an existing home, the GNP loss estimate for a refinance will also be prorated at a 61.03 percent rate to equal $503. The estimate for a new home sale (prorated at 64 percent) will be $72,156. We believe these figures provide very conservative estimates of the impacts on GNP.

GNP Loss Calculation

GNP Loss--New Homes:

33,037 x $72,156 = $2,383,817,772

GNP Loss--Existing Homes:

140,408 x $11,363 = $1,595,456,104

GNP Loss--Refinances:

46,803 x $503 = $23,541,909

Total GNP Loss = $4,002,815,785

= at least $4 billion

TABLE 1

ESTIMATING REGIONAL LOSSES

The following computations assume that the total GNP loss can be allocated proportionally to the regions based on 1985 FHA insured cases in each Census region. (SEE TABLE 6 for date from the "Summary of Mortgages Endorsed in 1985 by Construction Type by State, Source A43 (SFIF)," Housing Information and Statistics Division, Housing-Office of Management, U.S. Dept. of HUD, 2/26/86). The regional proportions for 1985 were as follows:

Regional Proportions of New and Existing
FHA Insured One-to-Four Family Cases--1985*
(Percent)

Region	New**	Existing
Northeast	1	10
Northcentral	12	22
South	42	36
West	45	32
	100	100

*Excludes Guam, Puerto Rico, and the Virgin Islands.

**FHA terminology is "proposed" construction versus "existing" construction for existing homes.

At the time of this analysis, there was virtually no data available from FHA on regional prices for new and existing homes in 1986, or even FY1986. The most recent data was for the Third Quarter of 1985, contained in "State Trends - A Supplement to FHA Trends" from the Housing Information Statistics Division. This publication contains informations on averagae sales prices of FHA Section 203 (b) new and existing homes by states. However, it was based on sample data — 557 loans for new homes and 11,376 loans for existing homes. The sample for new homes also only includes loans insured in California, Florida, Montana, Nevada, Texas, and Puerto Rico. There are also about a dozen states missing from the existing homes section. Because of the poor coverage of the new homes data, and missing states problem, it was decided to use the national average prices for the third quarter, instead of constructing regional prices. This assumption will tend to underestimate impacts in the West and the South where there is a high volume of loan activity and/or higher home prices. Assuming that the estimated impact per resale, new sale, or refinance is the same for each region, the regional impacts are calculated below:

REGIONAL INCOME LOSS ESTIMATES

Northeast Region Income Loss

	Regional Percent	Estimated Number	Est. GNP Impacts	Total Est. Regional Loss
New	1	330	$72,156	$23,811,480
Resale	10	14,041	11,363	159,547,883
Refinance*	10	4,680	503	2,354,040
Total Regional Loss				$185,713,403

Northcentral Region Income Loss

	Regional Percent	Estimated Number	Est. GNP Impacts	Total Est. Regional Loss
New	12	3,964	$72,156	$286,026,384
Resale	22	30,890	11,363	351,003,070
Refinance*	22	10,297	503	5,179,391
Total Regional Loss				$642,208,845

Southern Region Income Loss

	Regional Percent	Estimated Number	Est. GNP Impacts	Total Est. Regional Loss
New	42	13,876	$72,156	$1,001,236,656
Resale	36	50,547	11,363	574,365,561
Refinance*	36	16,849	503	8,475,047
Total Regional Loss				$1,584,077,264

Western Region Income Loss

	Regional Percent	Estimated Number	Est. GNP Impacts	Total Est. Regional Loss
New	45	14,867	$72,156	$1,072,743,252
Resale	32	44,930	11,363	510,539,590
Refinance*	32	14,977	503	7,533,431
Total Regional Loss				$1,590,816,273

*Assumes existing proportion for the region for resale homes applies to the regional proportion refinanced.

Total National Loss as sum of Regional Loss Estimates

Region	Loss Estimate
Northeast	$185,713,403
Northcentral	642,208,845
South	1,584,077,264
West	1,590,816,273
Total National Loss	$4,002,815,785

The above calculations assume that home prices in each region average out to the third quarter 1985 national averages of $57,977 for an FHA-insured resale home and $68,877 for a new home. As indicated above, both of these are probably underestimates for 1986. It also assumes that the GNP impacts are primarily realized in that region--that is the initial impact and virtually all multiplier effects accrue primarily to the regional economy. A slightly weaker assumption that would still justify the results, is that any spill-over multiplier effects (i.e., leakages from the region) from one region to another are offset by reverse spill-over effects from other regions. These assumptions do not appear to be unreasonable given the large size of the Census regions and the fact that they are for the most part, contiguous.

TABLE 2

FHA SINGLE-FAMILY ACTIVITY--TOTAL INSURED CASES BY MONTH
(NEW AND EXISTING PROPERTIES)

Fiscal Year		FY 1984	FY 1985	FY 1986
	Calendar Year	1983	1984	1985
	October	45,110	23,002	59,060
	November	37,792	23,611	53,378
	December	33,696	22,525	55,771
	Calendar Year	1984	1985	1986
	January	33,536	44,914	65,860
	February	29,001	30,843	63,472
	March	30,443	39,737	297,541
	April	31,763	39,105	
	May	32,032	39,066	
	June	31,989	35,614	
	July	28,009	40,831	
	August	30,794	46,394	
	September	20,931	55,738	
Total FY		385,096	441,380	906,371*

*Estimated Based on FY 1985 Insurance Case Rates

Source: FHA Field Office Reports

TABLE 3

FHA REFINANCING OF EXISTING LOANS

FY 1985

1984	Percent
October	10.0
November	11.5
December	14.1
1985	
January	14.2
February	16.8
March	15.1
April	13.2
May	13.6
June	12.3
July	13.3
August	12.5
September	13.8
FY85 Average	13.37
FY 1986	
October	13.1
November	12.9
December	14.7
1986	
January	21.3
February	24.9
March	30.0
Average FYTD	19.48

Source: FHA Single-Family Operations Reports, Housing Information Statistics Division, U.S. Department of HUD.

Figure 1

SCHEMATIC DIAGRAM OF GNP IMPACT ESTIMATION
(BASE CASE PARAMETERS: 40.5%, 60%, 15%/85%, 75%/25%)

Estimated
Total Cases
FY86
906,371

Total Cases
Remainder of FY86
June-Septmber
40.5% of Total
367,080

Total Cases Dependent
on FHA Insurance
60% (i.e. LTVs - 90%)
220,248

New (15%)
33,037 homes

Existing (85%)
187,211

(75%)
Resale
140,408

(25%)
Refinance
46,803

GNP Impact of
New Home Lost

Reional Impacts
(percent)

NE	NC	S	W
1	12	42	45

GMP Impact
of Resale Lost

Regional Impacts
(percent)

NE	NC	S	W
10	22	36	32

Lesser GNP Impact
Refinances Lost

Regional Impacts
(percent)

NE	NC	S	W
10	22	36	32

TABLE 4

FREQUENCY DISTRIBUTIONS OF LOAN-TO-VALUE (LTV) RATIOS BY FHA PROGRAMS: THIRD QUARTER 1985--Percent

LTV	Section 203(b)		Section 221		Section 223		Section 244		Section 265		Section 270	
Categories	New	Existing	New	Existing	New	Existing	New	Existing	New	Existing	New	Existing
Up to 75	12.8	10.5		1.2		1.7		13.5			6.0	6.4
76 to 85	16.7	14.5		4.5		22.5		20.9	50.0		18.2	15.2
86 to 89	12.4	17.2	NA	5.4	NA	6.9	NA	16.3		NA	24.2	18.2
90 to 94	14.0	14.5		17.9		27.6		18.0	50.0		27.4	46.1
95 to 99	39.6	41.4		65.0		31.0		31.3			24.2	13.9
100 and over	4.5	1.9		6.0		10.3		0.0			0.0	.2
Average LTV	89.1	89.6	NA	95.4	NA	92.1	NA	87.4	88.6	NA	89.5	88.8
Median LTV	93.4	92.9	NA	97.0	NA	93.5	NA	89.8	86.0	NA	90.2	90.8

NA: Not Appropriate/Not Available

TABLE 5

CONTRIBUTION OF SINGLE-FAMILY RESALES AND CONSTRUCTION TO GNP*

	Dollars	
Average Price	Resale	New
	95,000	107,500
Contribution to GNP		
Construction	--	65,500
Expenditures Before Resale	950	--
Expenditures At Sale	9,000	5,800
Expenditures After Sale	1,900	2,150
Lender's Income Net of Cost of Funts	550	1,580
Mortgage Insurer's Income	13	48
Subtotal	12,413	75,078
Multiple Effect on GNP	6,207	37,539
Total Effect on GNP	$18,620	$112,617

Source: NATIONAL ASSOCIATION OF REALTORS®

*Since the estimates are based on average resale and new home prices, they can be pro-rated by the average FHA prices, to determine multiplan effects for the typical FHA new and resale home (SEE TABLE 4).

The following section on Estimating the Contribution of Resale of New Homes to GNP" explains the methodology employed in the above estimates.

TABLE 6

ESTIMATES OF GNP IMPACTS

NATIONAL ASSOCIATION REALTORS® Estimates:

	Resale	New
Average Price 1986	$95,000	$107,500
Total GNP Impact	$18,620	$112,617

FHA Estimates: Third Quarter 1985: FHA TRENDS (of Home Mortgage (Section 203 (b)) Characters)

	Resale	New
Average Price	$53,084	$68,877

Proration of GNP Impact

FHA Price $57,977
NAR est. Price= $95,000 = 61.0284%
FHA Impact per Resale Lost = 61.03% of $18,620 = $11.363

New

FHA Price $68,877
NAR est. Price= $107,500 = 64.07%
FHA Impact per New Home Lost = 64.07% of $112,617 = $72,156

Refinance

FHA Price $57,977
NAR est. Price $95,000 = 61.0284%
GNP Impact per Refinance Lost = 64.07% of $825 = $503.

ADDENDUM TO TABLE 4

ESTIMATING THE CONTRIBUTION OF RESALE AND NEW HOMES TO GNP

The resale and new home markets are important to GNP because home sales contribute substantially to GNP through increases in expenditures associated with the home purchase.

When an existing or new home is sold many people gain from the transaction. Certainly the buyer and seller benefit by moving into homes which better suit their current needs. And, of course, mortgage lenders and real estate practitioners gain from the transaction. In analyzing the impact of these transactions, it is useful to examine the following expenditures associated with homebuying--those that take place at the time of sale, before the sale and after the sale.

Expenditures at Time of Sale

A member of business firms benefit from the direct expenditures which take place at the time of the home sale. These businesses include: household movers, attorneys, real estate appraisers, termite inspectors and structural inspection firms, surveyors, property insurance and title insurance companies, and the local governments which earn fees and taxes on the transaction. On average, these expenditures will total about $9,000 for each resale transaction in 1986, and $5,800 for each new home sale.

Expenditures Before the Sale

In calculating the contribution to GNP of a resale transaction we should not overlook the expenditures that are made by owners immediately prior to putting their home on the market. Since home sellers strive to present their home in he best possible light, many repairs and clean-up jobs that may have been postponed are done just before the house is placed on the market. Local merchants and contractors receive income from these expenditures, in particular: painters, hardware and building supply stores; carpenters; roofing, plumbing, and electrical contractors; lawn service companies and gardeners; carpet and drapery cleaners; heating and cooling contractors; and appliance repair services. Typically these expenditures will average $950 for each resale in 1986.

For new home sales, the obvious expenditure before the sale is the cost of constructing the housing unit, which involves many of the same businesses These costs will average $65,500 in 1986.

Expenditures After the Sale

There is also a strong relationship between buying a new or existing home and the subsequent purchase of additional goods and services. In the months following a home sale transaction, homebuyers outspend nonmover homeowners by a substantial amount. These after-sale expenditures range from major capital improvements and the purchase of furnishings down to the purchase of numerous smaller household and yard items. Analysis of Bureau of Labor Statistics consumer expenditure tapes used to construct the Consumer Price Index identified seven categories of goods and services in which recent buyers outspend nonmover homeowners:

- Nonrecreational household furnishings (furniture; linens; minor and major appliances; etc.)

- Capital improvements (building or modernization of rooms, garages, or wings; construction of patios, driveways, or walkways; plastering or paneling improvements; heating or air conditioning improvements, etc.)
- Miscellaneous consumption (telephone service; service and maintenance contracts, etc.)
- Recreational household furnishings (stereos, television, radios, etc.)
- New vehicles (automobiles and trucks)
- Clothing
- Insurance and pensions

Overall, homebuyers in 1986 will have outspent non-mover households by $1,900 for resale homes and $2,150 for new homes within the 12 months immediately following a home purchase.

The Multiplier Effects Are Substantial

The impact of resales or new home sales on GNP is even more staggering when you consider the subsequent rounds of spending which occur as businesses and workers take the increased earnings from recent homebuyers' expenditures and spend them on a wide range of goods and services. These secondary and tertiary rounds of spending cover a wide range of products and are often diffused well beyond the boundaries of the local community in which the home sale takes place. In 1986, these additional rounds of expenditures will total about $6,207 per existing home, and $37,539 for each new homes sold. A major portion of the new home multiplier effect is due to the multiplied effects of the initial construction expenditures.

Total Contributions to GNP Per Transaction

On a per unit basis each 1986 resale will resulted in almost $12,413 of direct expenditures and over $6,207 of secondary expenditures. Each new home sale in 1986 will result in $75,078 direct expenditures and $37,539 in multiple expenditures. Together, these expenditures will contribute over $18,000 for a resale and $112,600 for a new home sale to GNP.

TABLE 7

REGIONAL DISTRIBUTION OF FHA SINGLE-FAMILY MORTGAGES ENDORSED IN 1985*

	Number of Loans				Mortgage Amounts ($s in 000s)			
Region	New	Existing	Total	% New	New	Existing	Total	% New
Northeast	823	34,042	34,866	2	$46,777	$1,628,935	$1,675,712	3
% of National	1	10	8	--	1	8	7	--
Northcentral	6,859	80,339	87,198	8	440,339	3,916,008	4,356,347	10
% of National	12	22	21	--	11	18	17	--
South	24,270	132,213	156,933	16	1,600,489	7,532,232	9,132,721	9
% of National	42	36	37	--	40	36	36	--
West	26,152	116,990	143,142	18	1,913,285	7,944,065	9,857,350	19
% of National	45	32	34	--	48	38	40	
National Totals	58,104	363,584	422,139		$4,000,890	$21,021,240	$25,022,130	

*Excludes Puerto Rico, Guam, and the Virgin Islands.

Source: Summary of Mortgages Endorsed in 1985 by Construction Type by State (A43 (SFIF)), Office of Management-Housing Information and Statistics Division, 2/26/86.

Note: These figures differ slightly from those provided by FHA Field Office Reports; however, they are considered the official figures for FHA single-family mortgage operations.

TABLE 8

CENSUS REGIONS BY STATE

Northeast: Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennslyvania, Rhode Island, Vermont.

Northcentral: Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, Wisconsin.

South: Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, West Virginia.

West: Alaska, Arizona, California, Colorado, Hawaii. Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, Wyoming.

STATEMENT OF PETER SAJEVIC, VICE PRESIDENT FOR GOVERNMENT CONCERNS AND EXECUTIVE DIRECTOR OF NOR HAVEN, SUR LA RUE AND NEKTON (MINNESOTA) ON BEHALF OF THE NATIONAL ASSOCIATION OF PRIVATE RESIDENTIAL FACILITIES FOR THE MENTALLY RETARDED

ACCOMPANIED BY ASSA COLLINS, ASSOCIATE DIRECTOR OF THE NATIONAL ASSOCIATION

Senator GARN. I shouldn't try to say this. Is Peter Sajevic here?

Mr. SAJEVIC. You did well.

Senator GARN. Good.

Mr. SAJEVIC. Good afternoon, Mr. Chairman.

My name is Peter Sajevic. You did very well.

I am president and executive director of three government agencies in Minnesota which provide an array of community-based services for people who are disabled in a variety of settings, including in their own homes, in apartments, in foster homes, and in group homes certified as intermediate care facilities for the mentally retarded.

I also serve as vice president for governmental concerns of the National Association of Private Residential Facilities for the Mentally Retarded, which represent more than 550 agencies and family care home providers nationwide that together provide residential services to more than 20,000 people with disabilities.

Accompanying me today is Assa Collins, associate director of the national association.

In the interest of time, I would like to submit our entire statement for the record ~~and~~ will briefly highlight our major concerns.

Our members offer a full range of residential services in alternative settings that enhance the development and self-dependence of people who are mentally retarded. Many of our members have successfully accessed section 8 housing assistance payments and the Section 202 Direct Loan Program to develop community-based housing. A few have been fortunate enough to acquire congregate housing services funding to provide the necessary support services for clients who live in section 202 housing. And some have obtained community development block grant funds to develop both housing and space for day programs for the people they serve.

People who are disabled often confront more severe difficulties in acquiring adequate and appropriate living arrangements than those who are not disabled. This population we serve often requires a supportive service to enable them to live in the community. Many who are physically disabled must also have barrier-free settings that can be provided in a community only with the development of new housing or the addition of structural modifications through existing housing.

The number of people on the waiting list of our member agencies attest to the fact that the amount of adequate and appropriate and available housing is insufficient to meet today's demands.

Each year the number of nonprofit organizations that apply for section 202 loans far exceeds the numbers which received firm reservations. The number of people with disabilities who are waiting to obtain and could benefit from section 8 rent certificates is extensive. As programs work and as people grow, section 8 often can be the only available and viable path way to semi-independent or self-dependent living.

In rural areas, the demand for loans under the Farmers Home Administration, section 515, and community facilities programs have also exceeded the availability of funds. Applications have not been made available for congregate housing assistance in several years, and community development block grant funds are in short supply for the development of buildings to house and provide these services for people who are disabled.

In short, the need is great, but the funding is limited. Attached to the statement we have submitted for the record a summary of the recommendations we are making to the subcommittee. Among these you will see that in addition to suggesting specific funding levels for programs I have mentioned, the national association is opposing termination of rural housing programs administered by the Farmers Home Administration and is urging rejection of the administration's plans to defer all section 202 funding for new housing projects this year.

The tremendous need nationwide for new housing for people with disabilities means that the momentum of new development must not stop. The demand already far exceeds the availabilities of adequate community-based housing. With our recommendations, you will see that we are also asking the subcommittee to instruct HUD to develop appropriate new standards and procedures for developing small group living arrangements under the section 202 program. The waste we see in time and funds stretches beyond belief, as our members are forced to comply with requirements designed for the development of large housing projects to serve the aging population.

We have made some headway in the authorizing committees with efforts to obtain separate standards and procedures for small community-based housing. The statutory change is not needed to obtain much of what we are seeking.

HUD standards for single-family housing would be much more appropriate than those for large high-rise and garden apartment development. HUD policy prohibits the development of homes that will serve more than 15 persons on one site, and independent living units may not serve more than 24 people.

Despite this, we are saddled with requirements for projects of 50 or more units with such things as soil borings, topographical surveys, land use intensity values, wide sidewalks, and similar unnecessary and sometimes inappropriate features.

HUD 202 processing is also designed for a large multimillion dollar projects requiring innumerable documents and stages of processing. These create extensive, expensive delays. Some builders refuse to develop HUD-supported housing, because the time and effort involved cannot be compensated under the funding limits contained in this program.

Mortgage amounts of under $1 million and/or projects consisting of 24 or fewer units could be more efficiently processed by using the mechanisms similar to those for the FHA single-family insurance program.

To date, HUD has refused to develop appropriate standards and procedures to process small housing projects. This not only results in increased, unnecessary costs for each home developed in the 202 program, but effectively removes HUD from supporting the state of the art momentum to promote smaller home-like alternatives for people with disabilities.

The National Association of Private Residential Facilities for the Mentally Retarded will greatly appreciate the support of this subcommittee in our efforts to obtain appropriate standards and processing for small projects.

Thank you for listening to our requests.

Senator GARN. Thank you very much. I appreciate your willingness to be here.

[A brief recess was taken.]

[The statement follows:]

STATEMENT OF PETER SAJEVIC, VICE PRESIDENT FOR GOVERNMENTAL CONCERNS, NATIONAL ASSOCIATION OF PRIVATE RESIDENTIAL FACILITIES FOR THE MENTALLY RETARDED

NAPRFMR WITNESS

Mr. Peter "Skip" Sajevic will testify on behalf of the National Association of Private Residential Facilities for the Mentally Retarded (NAPRFMR). Mr. Sajevic is NAPRFMR Vice President for Governmental Concerns and is Executive Director/President of Nor Haven, sur la rue and Nekton in Minnesota. Through these agencies he manages the delivery of residential services to more than 500 people who are disabled.

SUMMARY OF NAPRFMR RECOMMENDATIONS

NAPRFMR respectfully submits the following recommendations to the Subcommittee on HUD - Independent Agencies of the Senate Committee on Appropriations:

- An appropriation for the HUD Section 202 Direct Loan program of $656.9 million to maintain the fiscal 1986 level of appropriations, plus an inflation factor, for housing developed for people who are disabled and elderly.
- Rejection of the Administration's plan to defer all Section 202 funding for new housing projects for this fiscal year.
- Support for significant cost-saving administrative changes in the Section 202 program that will separate standards and procedures for developing small group living arrangements from those used for large housing projects.
- Rejection of the Administration's proposal that rural housing programs currently administered by the Farmers Home Administration be maintained by HUD in future years.
- Sufficient appropriations in the Section 8 Housing Assistance Payments program in FY 1987 to cover loans made in connection with the Section 202 Loan program, and to continue funding rental assistance payments in both urban and rural areas at 1986 levels, with a 4.1% increase to cover the costs of inflation.
- Rejection of the Administration's proposal that the Section 8 program be converted to a system of vouchers.
- An appropriation of $4.27 million for the Congregate Housing Services program in FY 1987 to return it to its 1985 purchasing level.
- An appropriation of $3.25 billion for the Community Development Block Grant program in FY 1987, which would continue the program at FY 1986 funding levels, including a modest increase for inflation.

INTRODUCTION

The National Association of Private Residential Facilities for the Mentally Retarded currently represents more than 550 agencies that together provide residential services in 48 states to more than 20,000 people with developmental disabilities. Our members offer a full range of residential services in alternative settings that enhance the development and self-dependence of their clients. Many have successfully utilized Section 8 housing assistance payments and the Section 202 Direct Loan program to develop community based housing for people with disabilities. A few have been fortunate enough to acquire Congregate Housing Services funding to provide necessary support services for some of their clients who live in Section 202 housing.

People who are disabled often confront more severe difficulties in acquiring adequate living arrangements than those who are not disabled. Many require the availability of services associated with the housing to avoid being institutionalized in more costly settings. For some this means the availability of live-in staff. People who have physical disabilities may require barrier-free accommodations that can be provided only with the development of new housing or the addition of structural modifications in existing housing. Together these necessitate the availability of more funds than are needed by other citizens, but people with disabilities generally have fewer resources available than the average person.

There is no current, reliable data available about the numbers of persons with disabilities who need housing assistance. Most NAPRFMR members have long waiting lists of persons seeking entry into their programs. Most on those waiting lists are unserved in the community. Many live with aging parents who will soon be unable to provide them with the support needed to remain in the community. If community housing is not available, these persons will be forced to live in more costly institutional settings that limit their developmental potential and which are also dependent upon federal financial assistance.

In addition to those living in the community who are seeking residential services, there are thousands still living in more restrictive institutional settings who need community housing which will enhance their development. For most, community placements are not only more appropriate but less costly. Many are involved in court ordered deinstitutionalization decrees. The need at this time is tremendous and growing.

SECTION 202 DIRECT LOAN PROGRAM

The Section 202 Direct Loan program and two of the Farmers Home Administration (FmHA) loan programs currently provide the only capital funding available to some agencies that serve people who are developmentally disabled. Each year the number of nonprofit organizations that apply for Section 202 loans far exceeds the number that receive fund reservations. The percentage of applications to develop housing for people with disabilities has also increased annually, and this results in a decrease in the percentage of approved fund reservations for our population. In rural areas, the demand for loans under the FmHA Section 515 and Community Facilities program has also exceeded the availability of funds. Our members' waiting lists are growing, and the potential future demand is even greater as those who have been able to remain at home with federally supported education programs outgrow that funding system. Yet the funding that is available through the 202 program continues to be squandered through the application of standards and procedures designed for large projects for people who are aging that are costly and inappropriate when used for small community based housing projects.

NAPRFMR and other members of the Consortium for Citizens with Developmental Disabilities (CCDD) have worked through the authorizing process to obtain statutory changes in the 202 program for housing developed to serve 15 or fewer persons. Although helpful legislation has been introduced in the House, it has not yet passed. Statutory change is not necessary, however, for HUD to develop standards and processing procedures that will be more suited to small housing projects. For example, soil borings are not necessary for family-like homes, nor are wide sidewalks that are incompatible with those in the rest of the neighborhood. Handicapped parking spaces designated by signs are also inappropriate in residential settings and add unnecessarily to the cost of housing developed by agencies that are attuned to the needs of people with disabilities. Many of the procedures for processing a small project from approval of the fund reservation to final closing are inappropriate and unnecessary for family-like housing and create interminable and costly delays. To provide some more specific examples: a NAPRFMR member recently spent $16,500 for some unnecessary surveys and soil borings. The surveys included a topographical survey not generally required for single family housing, and soil borings that are seldom required for one- or two-story housing unless there is a history of problems with the site (such as land fill or swampy land) and in such cases they are not as extensive as those required for large highrise buildings. In this case, the second two soil borings were necessitated by processing delays and cost $7,500. Procedures designed to prevent a potential abuse when land is purchased from the project builder have also recently resulted in tens of thousands of dollars in added cost to another of our members when a waiver was unavailable, and evidence that the cost of the land was still far below that of other available properties was ignored. These are problems that could and should be avoided so that available 202 dollars can be spent in a cost effective manner. We would like this Subcommittee to instruct HUD to eliminate these unnecessary expenditures which are designed primarily for large highrise projects. Our members who qualify for conventional mortgages can develop excellent housing that is less costly in a far shorter period of time. The added costs to develop small HUD-supported housing is inexcusable and should be corrected as soon as possible.

Ironically, problems that occur in the HUD program do not surface to the same degree in rural projects funded by FmHA, which the Administration proposes to give to HUD to manage. NAPRFMR opposes termination of FmHA housing programs. People with disabilities who live in rural areas have an even more difficult time than those in suburban or urban areas in acquiring adequate housing; and FmHA has a more successful record in dealing with people at a local level and processing projects more efficiently. If the HUD and FmHA housing programs were consolidated, there would be a reduction of more than 50% in the amount of funding available to construct or rehabilitate congregate housing in urban and rural areas.

NAPRFMR is encouraged by action in both Houses to overturn the President's plans to defer HUD Section 202 spending this year, and by the Senate Budget Committee's action to protect funding for federal housing programs in FY 1987. However, we do not believe that the Committee budget provides sufficient funding for housing for low-income Americans, including those who are disabled or elderly, for FY 1987.

NAPRFMR is seeking an appropriation level of $656.9 million for the HUD Section 202 program in FY 1987, which would provide funding for the same number of units approved for FY 1986. The Association also strongly urges the Appropriations Subcommittee to instruct HUD to develop separate standards and processing procedures for the development of small, family-like living arrangements under the Section 202 program. We also urge continued rejection of the Administration proposal to transfer responsibility for the development of all rural housing from FmHA to HUD; and we seek immediate action to overturn the deferral of 202 funds appropriated for FY 1986.

SECTION 8 HOUSING ASSISTANCE PAYMENTS

Section 8 housing assistance payments support not only people who live in housing constructed through the Section 202 Loan program, but many people who are able to live relatively independently in rental housing available in the local community depend upon Section 8 certificates to supplement their rent. Most, if not all of these people would be in more restrictive and more expensive living arrangements — generally funded through other public resources — were the rent certificates not available. The Section 8 program is a cost-effective way of enabling low-income persons who are disabled and who require supportive services to remain in the community.

For several years Congress has rejected the Administration's proposal to convert Section 8 to an unproven voucher program. The voucher system fails to address both of the major purposes of the Section 8 program — the provision of adequate housing to low-income Americans, and stimulation of the housing industry by supporting the development of such housing. HUD minimum property standards would not apply under the voucher program and this would result in the use of federal funds in unsafe, unsanitary and inadequate housing. The use of vouchers would also eliminate the incentive provided in the Section 8 program for developers to create housing for low-income families and individuals that indirectly supports the housing industry. The ultimate result will be further deterioration of the already inadequate stock of housing for low-income persons, and an increase in the numbers of homeless individuals, a growing number of whom are disabled.

NAPRFMR recommends that Congress continue to reject the Administration's efforts to convert the Section 8 program to a voucher system; and that sufficient funds be appropriated in FY 1987 to, at minimum, cover loans made in connection with the 202 Loan program and to continue funding rental assistance payments in both urban and rural areas at 1986 levels, with a 4.1% increase in the appropriation level to cover the cost of inflation.

CONGREGATE HOUSING SERVICES

As people with more severe levels of disability move into the community, there is a growing need for more in-house services. Federal, state and local sources of assistance for support services have declined over the past five years. Services such as meals, transportation, personal care and housekeeping assistance enable people with disabilities to remain relatively self-dependent and avoid their institutionalization in more costly settings. Support services are essential to keep most specialized congregate housing programs viable. The Congregate Housing Services program has assured that necessary services would be available to tenants of select Section 202 and public housing projects.

Appropriations made in 1980 were originally viewed as start-up funds, but additional appropriations have not been forthcoming, despite the success of the program. In 1985 the Congregate Housing Services program was cut from $10 million to $4.1 million. The FY 1986 appropriations level is only $2.67 million, and this was reduced still further to $2.56 million through sequestration. As a result, people who have received these services are at risk of having to move to more restrictive settings which will place an even greater demand on federal funds.

NAPRFMR recommends that appropriations for the Congregate Housing Services program be returned to the 1985 purchasing level of $4.27 million.

COMMUNITY DEVELOPMENT BLOCK GRANT PROGRAM

The private sector has utilized funding provided to local communities through the HUD Community Development Block Grant program to acquire and rehabilitate buildings used as apartments and congregate living arrangements for people who are developmentally disabled. These funds have also been used for sheltered workshops and day activity centers that provide day programming for people living in residences managed by NAPRFMR members. It is important to recognize that many of the people served by day programs continue to live at home with their families. Without these daytime resources, many families could not cope with the stress of having a person who is disabled remain at home. The development of facilities that provide day services is an important factor in preventing more costly 24-hour care.

The Administration has proposed what amounts to a one-third reduction in the CDBG program for FY 1987, drastically reducing the resources local governments have used to spur revitalization, economic development and service delivery. If this is done, another important resource for developing facilities for people with disabilities will be significantly reduced when funding from other sources is also being curtailed.

NAPRFMR recommends that an appropriation of $3.25 billion be approved for the Community Development Block Grant program in FY 1987. This would continue the program at FY 1986 funding levels, with a 4.1% increase for inflation.

STATEMENT OF SUZAN SHOWN HARJO, EXECUTIVE DIRECTOR, NATIONAL CONGRESS OF AMERICAN INDIANS

Senator ABDNOR [presiding]. The committee will come back to order. We have been out of step here, but I guess the main thing is to make sure we give our witnesses an opportunity to appear and be heard. So I think we are a little bit late, I guess, with Suzan, but we are happy to have you here, and it is all yours. Suzan Harjo, of the National Congress of American Indians.

Ms. HARJO. Thank you, Senator. Before we launch into our wish list, I would like to thank you for your hard work in the Senate on behalf of Indian people and such sincere and dedicated work, that we really do appreciate it. It is noted, it is appreciated, and I am sure it will be reflected.

Senator ABDNOR. Thank you. Thank you very, very much. I appreciate that. We are just doing what we think is our job, and we want to represent you the way you are entitled to be represented. We thank you for those comments.

Ms. HARJO. We begin our written testimony, which I presume will be included in the record, by noting that there is very little talk these days about the safety net for this administration, and you have pointed this out so many times, that it really does not exist for Indian people and in any of the administration budgets we have seen.

In the Indian housing budget that the administration keeps proposing year after year, we see that the safety net is really quite callously disregarded. The administration has proposed to do three things: To rescind all fiscal year 1986 appropriations for the 2,000 Indian housing units; to recapture, which is the polite way of saying wiping out, the 2,000 housing units for which funds have already been appropriated; and wiping out the Indian housing program in fiscal year 1987 and replacing it with a voucher system which HUD officials have said does not work in Indian country.

It is questionable whether it works at all, but it certainly does not work in Indian country, we don't think, and we do agree that it takes a very long time to build Indian housing units. But that is because of the awkwardness of the structure of Federal Indian housing programs that is built between the BIA, HUD, and IHS. In recent years, HUD has recaptured some 150 housing units per year, so the 2,000 unit recapture proposal which would take place in 1 year would be a really drastic measure.

On the Navajo Nation Reservation, they are looking at a need of 30,000 housing units, and other tribes have a need for a great deal more units than the 2,000 that are proposed nationally. Ours is the fastest growing population of any identifiable group in the country, and we definitely do need some housing.

For this administration to propose this kind of initiative again is tiresome and is something that we are certain the Congress is going to reject, once again. We don't quite understand why they keep coming back with this kind of proposal rather than trying to find something that will help improve the standard of housing in this country.

Indian housing has been identified as the worst in the Nation. There has been little examination of Indian native materials, adobe brick, for example, which is now being used in some houses, but only a couple of hundred; of the kinds of things that could be done now to improve Indian housing.

There is almost no emphasis on solar design. The National Congress of American Indians, as you are aware, is established for the purpose of the Indian tribes, for the Solar Energy and Energy Conservation Bank, commonly known as the Solar Bank, and we provide loans and grants as a pass-through to the tribes for solar conservation experiments and retrofits, usually in housing units.

HUD itself is not nearly so advanced as the tribes are advanced in this area. Most of Indian country exists in sun, in the sun country, and in the West and the South of the United States. We may not have a lot, but we do have sun. We are particularly concerned about the kinds of deemphasizing that HUD is now placing on interaction with Indian people who do know the Indian housing area.

Now, as we speak, in San Diego, CA, there is a HUD housing program going on which passes for consultation, and we have one of our staff members there taking part in that meeting.

It is odd, though, that there are consultation meetings in various parts of the country, but there is little evidence that consultation is taken to heart. Indian people have been telling HUD over and over and over again what we need, and we keep getting some proposal given to us that we just have to fight and waste our time fighting because we know probably the ultimate outcome, and we don't know why this waste of our time, of the Congress' time and of HUD's time, is being proposed. That seems to be the only possible outcome of these proposals year after year.

ENVIRONMENTAL PROTECTION AGENCY

On the Environmental Protection Agency, we want to point out a number of concerns that are primarily centered on EPA's lack of initiative in informing the Congress about the needs in Indian country. We have seen that the EPA put out a very nice little book called "EPA Activities on Indian Reservations, Fiscal Year 1985," which purports to tell the world what EPA has has done to implement the EPA Indian policy which was initiated pursuant to the President's Indian policy statement in 1983. The EPA policy took place in 1984.

EPA does not ask Congress to give any more money to EPA for Indian programs, although what we hear in Indian country is that without Congress giving money, that they can't fully implement policy. This particular book is a compilation of what EPA has done over the years and is doing now and anything that might be remotely connected with Indian country, even if it is not an Indian reservation-specific program.

EPA has not been forthcoming with the Congress and certainly not with this committee about the money needs required in the Safe

Drinking Water Act, the Clean Water Act, Superfund, all of which Congress is likely to enact, and specific Indian provisions. I would just urge this committee to urge EPA to fully implement their Indian policy. It is a good policy, a sound policy; and to be forthcoming with the Indian people and with this committee and the Congress as a whole about the need that exists in Indian country for hazardous waste surveys, good ones; for environmental surveys, good ones, rather than the ongoing, piecemeal efforts that are passing for consultation and Indian generated surveys.

One last item is that EPA does not participate at all in the Nuclear Waste Policy Act implementation of 1982, and they say that they have no handle under that act because Congress hasn't given them one. We feel that it is very important that an agency of the United States with the responsibility for environmental protection be part of the Nuclear Waste Policy Act, especially in light of the tragedy that is occurring across the globe from us.

The Indian tribes are deeply concerned about the Nuclear Waste Policy Act and are deeply affected by it and immediately affected by it and would like some involvemant of EPA, and we haven't seen that forthcoming.

Senator ABDNOR. It has just started, isn't that it?

Ms. HARJO. That is right; that is right. It used to be in our meeting with the Department of Energy nuclear waste people and Bureau of Indian Affairs people that EPA would be sometimes represented. It is no longer even represented, and neither is B!A. So we do feel not that the Department of Energy is not doing its job, because we feel it is, but that this is a shared responsibility at Indian Affairs, or a shared responsibility of the United States as a whole, and we need greater attention, not less attention, especially in matters as serious and potentially dangerous as nuclear waste.

Senator ABDNOR. I'm sorry to hear that you have had no response from this group. Maybe we will have to visit them to determine what the problem is on this.

Ms. HARJO. We certainly will.

Senator ABDNOR. And we will see where we are. No decisions have yet been made on this. It is not going to be an easy budget to work with, the way they have cut it. We certainly hope that you are going to be treated fairly in this thing. Every one of our subcommittees is suffering the same way.

We will certainly see what we can do, and we thank you for being with us today.

Ms. HARJO. Thank you, sir. Good day.

Senator ABDNOR. Good day.

[The statement follows:]

STATEMENT OF SUZAN SHOWN HARJO, EXECUTIVE DIRECTOR, NATIONAL CONGRESS OF AMERICAN INDIANS

On behalf of the National Congress of American Indians, the nation's oldest and largest membership organization representing American Indian and Alaska Native governments and people, thank you for the opportunity to comment on housing and environmental appropriations issues.

HOUSING

We ask that this Subcommittee once again reject the Administration's callous budget proposals regarding Indian housing. There is very little discussion by Administration officials these days about a "safety net". Anyone who believes that the Administration budget proposals provide for a safety net need only to look at the Indian and public housing budgets to see that it does not exist. The Administration has proposed to: 1) rescind all FY1986 appropriations for the 2000 Indian housing units, 2) "recapture" or cancel funds for up to 2000 Indian housing units for which funds have already been appropriated and 3) terminate the Indian housing program in FY'87 and replace it with a voucher system, a system which HUD officials have testified is totally unworkable in Indian country.

With regard to the FY'86 rescission request, we are pleased that Congress has seen fit to let this recommendation die. However, the Housing Assistance Council has received disturbing signals from HUD that they may try to defer spending at least a portion of the FY'86 monies for Indian housing even though Congress did not approve the rescission request. We would appreciate this Subcommittee's assistance in getting an answer from HUD on this matter.

The Administration in late March proposed to initiate an accelerated policy of recapturing up to 2000 Indian housing units. This is in addition to their FY'86 rescission proposal. Recapture is actually a cancellation of Indian housing units in the pipeline at an early stage of development. HUD Indian Housing Director John Meyers based this action on a March 18, 1985 memorandum sent to Indian housing authorities which said that housing units would be recaptured if the development process did not move at a satisfactory rate. Development activities of Indian housing generally do take longer than for public housing because of the required coordination between the tribe, tribal housing authority, builders, contractors, BIA, HUD and IHS. No pattern of tribal delay of development has been shown. We oppose the recapture of Indian housing units except in cases where it is clear that the construction cannot take place. In recent years HUD has recaptured 137 to 179 Indian housing units per year, and so the 2000 unit recapture proposal (which would take place in one year) would be a drastic measure.

We ask that the FY1987 HUD budget allow for continuation of at least 3000 housing units (as contained in H.R. 1, the Housing Act of 1985). We also urge this Subcommittee to include in its FY1987 appropriations bill language which directs any Indian housing units recaptured in FY1987 to be reused for Indian housing projects. Without reuse these units are lost to Indian country. There has been a suggestion that any reused units be deducted from the FY1987 housing allocation for the Indian housing program. That is not acceptable to us, and would be a regression in the effort to provide Indian families with decent housing. The BIA estimates that there is a need for 60,000 new housing units and 30,000 units in need of renovation. This is undoubtedly a conservative estimate, as the Navajo Housing Authority estimates a need for 30,000 new houses on the Navajo Nation. That is fifteen times the FY1986 2000 unit allocation for all of Indian country.

The Administration's proposed voucher system will not work in Indian country, an admission openly made by HUD officials. HUD General Deputy Assistant Secretary James Baugh was quoted in the Febrary 8, 1986 Washington Post as saying, "Vouchers don't work at all on an Indian reservation" and in response to questions by Senator Mark Andrews, Mr. Baugh wrote on April 8, 1986, "the voucher system is not expected to work in Indian country. The section 8 voucher system relies on the availability of private rental housing in Indian areas." We urge this Subcommittee and Congress to dismiss out of hand the voucher system for Indian country.

Even though the Administration wans to have only a voucher program for public and Indian housing, it nevertheless is proposing a new system of financing housing construction. It proposes to switch from the current system of financing housing from long-term authority or sale of bonds to up-front appropriations. This financing method was widely discussed when the Internal Revenue Service (IRS) was questioning the legality of public housing bonds to be tax exempt. Even though the IRS evidentually did rule that public housing bonds are tax exempt, the Administration is still proceeding with its proposal of up-front appropriations. While direct payments for housing construction would be less expensive than long-term authority, a direct financing method would swell the HUD appropriations bill, and we doubt that this would be acceptable to Congress at this time of deficit reduction efforts. People in the private market do not pay up-front money for housing; rather it is amortized over time.

NCAI is pleased that HUD has begun some limited use of native building materials in HUD-assisted housing. We understand that five Southwestern Indian Housing Authorities are using traditional materials such as adobe and stone in 65 units. We urge that the authority to use traditional materials be expanded.

While we are concerned about the numberof federally subsidized housing units that will be constructed in Indian country, we are equally concerned with the costs that Indian families have to pay to keep these houses warm. In recent years a substantial portion of Indian housing units that have been built have been equipped with electric space heating, apparently because of the low front-end cost and without concern for the high operating costs for this heating option. We believe that HUD should be required to adequately evaluate the operating costs of heating systems used in subsidized housing. We believe that the evaluation of heating systems should include a preference for passive solar design, either as a primary heat source or as a way of reducing the operating costs of any other primary heating system. We note that passive solar design can usually be incorporated into single family housing at a modest incremental cost (5 percent or less) and that this modest incremental costs can usually cut heating expenses in half. HUD regulations currently permit an increase in prototype cost to accomodate special conditions, which could include passive solar design.

However, some stronger Congressional directive is needed if passive solar design in Indian housing is ever going to become the standard rather than the exception, and we believe that passive solar should become the standard. A HUD program which could be used to help pay for the incremental cost of incorporating passive solar design into new Indian housing is the Solar Energy and Energy Conservation Bank.

A program which we ask the Subcommittee to support is the Solar Energy and Energy Conservation Bank, commonly known as the Solar Bank. The Solar Bank is a federal assistance program administered by HUD. Assistance is provided in the form of loan subsidies for investments in energy conservation and solar for residential, agricultural and commercial buildings. Matching grants also may be provided to very low-income households for energy conservation. The assistance is distributed through state programs, and the National Congress of American Indians (NCAI) Fund serves as the Indian assistance coordinator. HUD treats the NCAI Fund as a state for purposes of this program. We ask the Subcommittee to approve increased appropriations for this Indian assistance and to take appropriate steps to encourage direct-to-tribe funding system for this program.

When the Solar Bank program was created by Congress in 1980, annual appropriations in the range of $1.5 billion were authorized. Actual appropriations have been less than two percent of this amount. There are no unallocated Solar Bank funds, and the Administration requested no money for this program for FY1987. We believe that Congress should increase its level of support for the Solar Bank. We note that Solar Bank assistance is only available for investments that are cost-effective, but that many low-income and moderate-income families cannot afford them, regardless of their cost-effectiveness. In Indian country, there are several thousand federally-subsidized housing units that were built with electric resistance heat as the primary heating system. Solar Bank assistance is an appropriate way to leverage private funds to lower the heating costs for these units through conservation and solar retrofit investments.

We believe that in evaluating the cost-effectiveness of the Solar Bank program, the Congress should direct attention to the high level of federal subsidies for nuclear electric power. In 1984, federal subsidies for nuclear electric, both direct and indirect, totaled more than $15.5 billion, with some significant factors not included (See Heede, et al., The Hidden Costs of Energy: How Taxpayers Subsidize Energy Production, Center for Renewable Resources, 1985.)

ENVIRONMENTAL PROTECTION AGENCY

The Environmental Protection Agency (EPA) finally established an Indian policy, "EPA Policy for the Administration of Environmental Programs on Indian Reservations", in November of 1984. NCAI recognizes that EPA is the only federal agency to set forth a policy consistent with the overall Federal position of support of Tribal "self- government" and "government to government" relations between Federal and Tribal governments. This general Federal policy was articulated in the President's September 1983 Indian Policy Statement. We commend the EPA for establishing such a policy. However, that Agency has never asked Congress for an appropriation for tribal governments. We find EPA's commitment to fully implementing its Indian Policy questionable since adequate funding is absolutely essential to the development of tribal environmental programs.

American Indian and Alaska Native peoples,representing the environmental conscience of the nation by their cultures, religions and philosophies have, in practice, been all but ignored by the EPA regarding assistance and resources to rehabilitate and protect our land. While EPA's Indian Policy Statement is certainly a positive step, it is nothing more than rhetoric if not accompanied by proper funding.

The 274 federally recognized Indian Tribes have jurisdiction over nearly 50 million acres, or more than three percent of the nation's land base. Tribal governments have jurisdiction over 43,410,186 acres of rangeland and forests, 1,829,118 acres of dry farmland, 917,580 acres of irrigation farmland, 913,000 acres of water reservoirs and lakes, 45,352 reservoirs and impoundments, 3,199 natural lakes and ponds and 12,000 miles of perennial streams. Certainly the EPA should be willing to spend proportionately as much protecting reservation environments as it does protecting the rest of the nation's environment. This is an equitable and just request.

Indian tribes and national tribal organizations have sought amendments to the Safe Drinking Water, Clean Water and Superfund Acts which recognize the proper authority of Indian Tribal Governments to regulate and enforce environmental standards on Indian lands. These amendments would afford tribal governments their proper role of participation in the federal regulatory framework in a manner consistent with the EPA Indian Policy, inherent tribal sovereign powers and existing federal law and policy. The conferences are nearly complete on Superfund, Clean Water and Safe Drinking Water legislation, and in each case language has been approved to ensure tribal participation in those Acts. It is, therefore, critical at this time for this Subcommittee to ensure that Indian tribal governments have the environmental protection support equal to and consistent with the rest of the nation.

Last year, tribal representatives presented testimony recommending that appropriations be earmarked for technical assistance and the expansion of staff resources to assist with the development of tribal environmental programs on Indian lands. While Congress did not approve an Indian set-aside, this Subcommittee did include the following directive language:

> "This Committee does feel that current levels of assistance clearly do not adequately address many serious and demonstrable problems confronting these semi-autonomous areas. The Committee, therefore, expects the Agency to make a concerted effort to impose in this respect within funds contained in appropriations bill." (emphasis added)

While the Senate directive for FY1986 is appreciated, it should be pointed out that the EPA has demonstrated only limited initiatives on behalf of the American Indian and Alaska natives. The EPA Indian Policy will be exercised to its full potential only when funds are provided expressly for the purpose of developing and enhancing Indian environmental programs.

A major obstacle for Tribal Governments seeking funding for environmental programs has been the virtual nonexistance of baseline data which accurately identifies the environmental problems and needs on Indian land. None of the agencies, including the EPA, The Bureau of Indian Affairs and the Indian Health Service, has this comprehensive data. Language in the Indian amendments to the Safe Drinking Water Act and Superfund and Clean Water Act directs EPA and Indian Health Service to conduct surveys which identify drinking water problems and hazardous waste sites on Indian reservations. In turn, these surveys should also identify adequate funding levels to properly address and document Tribal environmental needs, needs which we know are enormous

Approporiations targeted for Tribal Governments to begin implementing environmental programs in FY1987 are needed for the expansion of EPA staff resources to deal exclusively with Indian environmental issues at both the central and regional offices. The National Congress of American Indians requests that the Subcommittee approve $10 million to conduct environmental needs surveys as will be required by the Clean Water, Safe Drinking Water and Superfund amendments and $5 million for expansion of EPA staff resources and technical assistance to tribes.

Mr. Chairman, we thank you for this opportunity to present our views. We will pleased to answer any questions at this time.

STATEMENT OF RICHARD MAPP, VICE PRESIDENT, NATIONAL CAUCUS AND CENTER ON BLACK AGED

Senator ABDNOR. Our next witness is Richard Mapp, the National Caucus and Center on Black Aged.

Mr. Mapp, we are happy to have you with us.

Mr. MAPP. Thank you, Mr. Chairman.

Senator ABDNOR. Welcome. We welcome you to the committee, and please go right ahead. If you have a longer statement you won't use in its entirety, we will be happy to make it a part of the record.

Mr. MAPP. Thank you, Mr. Chairman. I will highlight some of the major points of our testimony in light of the number of panelists that you have after us.

Mr. Chairman, we appreciate—that is, the National Caucus and Center on Black Aged—the opportunity to testify at this hearing. The National Caucus and Center on Black Aged or NCBA for short, we have four key proposals we wish the subcommittee to adopt in your consideration of the fiscal year 1987 budget for HUD especially.

We recommend a freeze for the housing program for older Americans at the fiscal year 1986 level, approved by the Congress before the 4.3-percent sequestration order became effective under Gramm-Rudman.

First, NCBA supports sufficient lending authority for the Section 202 Direct Loan Program, together with the requisite section 8 assistance, to finance the construction or substantial rehab of 12,000 units. It is essential that these programs work together in tandem, because many aged Americans need section 8 assistance to pay the rent for a section 202 apartment.

In addition, Mr. Chairman, we urge the subcommittee to reject the administration's proposed voucher system to serve as a substitute for traditional housing programs such as section 202 and public housing.

NCBA fears that this approach may simply become a subsidy for inadequate housing without improving the supply of quality housing for the elderly poor.

We are deeply concerned that aged blacks may be the big losers if a voucher system should completely replace future commitments to produce federally financed housing. A voucher system, which funnels money for already inadequate numbers of quality units, will not increase the supply, but it may drive up demand, which almost assuredly will boost present housing costs.

NCBA believes that the section 202 program for the elderly handicapped deserves continuation. It is, in our judgment, the most effective housing program ever developed. Section 202 has provided quality and affordable housing that is tailor-made for older Americans.

The need for section 202 is clearly much greater than 12,000 units. NCBA is recommending this level, however, because of the present budgetary realities.

NCBA also urges that there be report language to encourage HUD to continue its efforts to promote more minority sponsorship of section 202 projects.

Earlier report language produced positive effects in stimulating more minority sponsorship of section 202 housing. We are recommending new report language to assure that these positive benefits will not come to an abrupt halt.

Minority sponsors have much to offer. They usually are more familiar with the housing needs of aged minorities and other low-income people. Moreover, they are more apt to locate projects in areas where there are heavier concentrations of elderly minorities in dire need of housing.

NCBA also hopes the subcommittee and the full committee will approve sufficient funding to maintain public housing and section 8 existing and moderate rehab at the presequestration levels.

This translates into 5,000 public housing units, 10,000 section 8 moderate rehab units, and 32,000 section 8 existing units. Housing is probably the most readily apparent problem facing older blacks and other Americans. Many now live in delapidated and unfit housing units. I won't bother to run over the figures, because I am sure that the subcommittee and yourself, Mr. Chairman, know about the figures.

Third, NCBA supports a $2.67 million funding level for the Congregate Housing Services Program, the same amount as the fiscal year 1986 appropriations before the 4.3-percent sequestration order became effective.

NCBA strongly believes that housing must be more than just bricks and mortar. In many cases, shelter must be combined with services to assist older persons to continue to live independently in their own homes instead of in nursing homes.

Many older Americans are unnecessarily or prematurely institutionalized at a much higher public cost. Congregate housing services can enable at risk persons to live independently in their own homes, where many would prefer to stay, rather than a nursing home. In our opinion, congregate housing services make sense, both economically and from a humanitarian standpoint. The evidence is clear and convincing that congregate housing can often more than pay for itself by preventing unnecessary or premature institutionalization.

Finally, we urge the subcommittee to include report language to encourage the Environmental Protection Agency to make greater use of senior environmental employment enrollees, or SEE enrollees. The language approved by the Senate HUD-Independent Agencies Appropriations Subcommittee for fiscal year 1986 works satisfactorily and could be used as a model for the fiscal year 1987 appropriation measure.

SEE enrollees have already conclusively demonstrated that they are effective workers in improving our environment. The Gramm-Rudman Hollings amendment has made it absolutely essential for governmental agencies to operate more economically. SEE can be an effective tool to enable EPA component units to fulfill their responsibilities in a cost-effective manner.

Much more remains to be done to improve our environment, and older Americans are an available resource. They are ready, willing, and able to assist in this undertaking. The need for their services is perhaps greater than at any time in history because of existing budgetary constraints.

In conclusion, Mr. Chairman, we wish to thank you again for the opportunity to present our views. Over the years, this subcommittee has been responsive to the housing needs of lower income older Americans in a financially responsible manner. We sincerely hope that you will continue to build upon this admirable record, because far too many older Americans are inadequately housed today, and this segment of our population grows rapidly with each passing day.

Thank you, Mr. Chairman.

Senator ABDNOR. Thank you, Mr. Mapp. Adding back to Gramm-Rudman sounds simple, but we are debating the whole budget right now. Progress isn't too rapid, but this committee will not be able to take any action until something is worked out.

We are different than the House. I guess they can go ahead and act on appropriations, but under our rules, we won't be doing anything until the Budget Resolution is passed. I assure you the committee will work on this—as you said, they have done so in the past—and see what they give us to operate with by the time we get through adopting a budget resolution, whenever that is going to be. We are kind of wondering ourselves.

Thank you very much for being with us today.

Mr. MAPP. Thank you, Mr. Chairman.

[The statement follows:]

STATEMENT OF RICHARD H. MAPP, VICE PRESIDENT, NATIONAL CAUCUS AND CENTER ON BLACK AGED, INC.

Mr. Chairman and Members of the HUD and Independent Agencies Appropriations Subcommittee, the National Caucus and Center on Black Aged appreciates the opportunity to testify at this hearing. Our testimony will focus primarilly on housing and other programs serving aged Blacks and other older Americans.

NCBA has four key proposals which we urge the Subcommittee to adopt during the consideration of the FY 1987 HUD-Independent Agencies Appropriations Act.

Section 202

In general, we are recommending a freeze for housing program for older Americans at the FY 1986 levels approved by the Congress before the 4.3-percent sequestration order became effective under the Gramm-Rudman-Hollings amendment.

First, NCBA supports sufficient lending authority for the Section 202 Direct Loan Program, together with the requisite Section 8 assistance, to finance the construction or substantial rehabilitation of 12,000 units. It is essential that these two programs work in tandem because many aged Blacks and other low-income older Americans need Section 8 assistance to pay the rent for a Section 202 apartment.

At the outset, NCBA urges the Subcommittee to reject the Administration's proposed voucher system to serve as a substitute for traditional housing programs such as Section 202 and public housing. NCBA fears that this approach may simply become a subsidy for inadequate housing without improving the supply of quality housing for the elderly poor. We are deeply concerned that aged Blacks may be the big losers if a voucher system should completely replace future commitments to build traditional federally-financed housing. A voucher system -- which funnels money for an already inadequate number of quality units -- will not increase the supply. But, it may drive up demand, which almost assuredly will boost present housing costs.

We fear that a voucher system may exacerbate a tight housing situation for elderly Blacks and other low-income older Americans by forcing them to pay more from their already limited income for inadequate and poor quality housing.

NCBA believes that Section 202 housing for the elderly and handicapped deserves continuation. It is, in our judgment, the most effective housing program ever developed. Section 202 has provided quality and affordable housing that is "tailor-made" for older Americans.

The need for Section 202 is clearly much greater than 12,000 units. NCBA is recommending this level, though, because of the present budget realities.

NCBA also urges that there be Report language to encourage HUD to continue its efforts to promote more minority sponsorship of Section 202 projects. Earlier Report language produced positive results in stimulating more minority sponsorship of Section 202 housing. We are recommending new Report language to assure that these positive developments will not come to an abrupt halt.

Minority sponsors have much to offer. They usually are more familiar with the housing needs of aged minorities and other low-income persons. Moreover, they are more apt to locate projects in areas where there are heavier concentrations of elderly minorities in dire need of housing.

Public Housing and Section 8

Second, NCBA urges the Subcommittee to approve sufficient funding to maintain public housing and Section 8 existing and moderate rehabilitation at the pre-sequestration levels during FY 1986. This translates to 5,000 public housing units, 10,000 Section 8 moderate rehabilitation units, and 32,000 Section 8 existing units.

Housing is probably the most readily apparent problem facing older Blacks. Many now live in dilapidated and unfit housing units.

A few brief comparisons will clearly demonstrate the sharp differences that currently exist in the housing area for aged Blacks and older Whites:

-- Older Blacks are 3 1/2 times as likely to be without plumbing for their exclusive use than elderly Whites (8.4% vs. 2.4%).

-- Aged Black households are four times as likely to live in housing without a complete kitchen facility than older Whites (7.3% vs. 1.7%).

-- Elderly Blacks are more than twice as likely to live in housing without central heating than older Whites (43.5% vs. 18.4%).

Our nation's housing response must be flexible and must include an appropriate mix to take account of the special needs of older Americans.

Public housing is especially crucial for older Blacks because they represent a significant percentage of tenants in these projects. Public housing is also important because poverty is so heavily concentrated among elderly Blacks. In fact, aged Blacks are three times as likely to be poor as elderly Whites.

Congregate Housing Services

Third, NCBA supports a $2.67 million funding level for the Congregate housing sevices program, the same amount as the FY 1986 appropriation before the 4.3 percent sequestration order became effective.

NCBA strongly believes that housing must be more than just bricks and mortar. In many cases, shelter must be combined with services to assist older persons to continue to live independently in their own homes instead of in nursing homes.

Many older Americans are unnecessarily or prematurely institutionalized at a much higher public cost. Congregate housing services can enable "at-risk" persons to live independently in their own homes -- where many would prefer to be -- rather than in a nursing home.

In our opinion, congregate housing services makes sense both economically and from a humanitarian standpoint. The evidence is clear and convincing that congregate housing can often more than pay for itself by preventing unnecessary or premature institutionalization.

Senior Environmental Employment Program

Finally, we urge the Subcommittee to include Report language to encourage the Environmental Protection Agency (EPA) to make greater use of Senior Environmental Employment (SEE) enrollees. The language approved by the Senate HUD-Independent Agencies Appropriations Subcommittee for the FY 1986 funding bill worked satisfactorily and could be used as a model for the FY 1987 appropriations measure.

SEE enrollees have already conclusively demonstrated that they are effective workers in improving our environment.

The Gramm-Rudman-Hollings amendment has made it absolutely essential for governmental agencies to operate more economically. SEE can be an effective tool to enable EPA component units to fulfill their responsibilities in a cost-effective manner.

Much more remains to be done to improve our environment, and older Americans an available resource. They are ready, willing, and able to assist in this undertaking. The need for their services is perhaps greater than at any time in our history because of existing budgetary constraints. We believe that earlier SEE projects have shown that older workers can perform environmental improvement tasks effectively, efficiently and economically.

Conclusion

In conclusion, we wish to thank you again for this opportunity to present our views. Over the years, this Subcommittee has been responsive to the housing needs of low-income older Americans in a financially responsible manner. We sincerely hope that you will continue to build upon this admirable record because far too many older Americans are inadequately housed today and this segment of our population grows rapidly with each passing day.

STATEMENT OF BERNARD GOULD, MEMBER, GOVERNMENT AFFAIRS COMMITTEE, ASSOCIATION FOR RETARDED CITIZENS OF THE UNITED STATES

Senator ABDNOR. Our next witness is Mr. Bernard Gould with the Association for Retarded Citizens of the United States.

Mr. GOULD. Good afternoon, Mr. Chairman. For the record, my name is Bernard Gould, and I am a member of the Government Affairs Committee of the Association of Retarded Citizens of the United States.

The Association for Retarded Citizens counts as its members the over 6 million U.S. citizens with mental retardation. Our priority concern, particularly in the last 10 years, has been the establishment of community-based services for people with mental retardation and the concomitant reduction in the number of the very large, frequently inhumane residential settings that many of them have been forced to call their home.

Our efforts have, and continue to be, greatly dependent on the availability of affordable, accessible, community-based housing, or an access to the means to develop that type of housing.

As a result, the people I represent and those who provide for them increasingly have come to depend on programs available through HUD which spur the development of and assure access to community living options. In particular, the ARC, through its many affiliates, has become one of the largest sponsors of handicapped projects in the Section 202 Loan Program since its availability was expanded to include programs with people with disabilities. We have found, as a 1984 report within HUD also concluded, that the private market in and of itself is not going to produce anywhere near sufficient housing to meet the needs of people with disabilities.

For those people, contrary to Secretary Pierce's remarks before this subcommittee earlier this month, availability clearly continues to be as major an issue as affordability. Thus, the continuance of assisted housing programs which both provides rental subsidies and encourages construction and rehabilitation, is a dual concern of our constituents.

Although the section 202 program has most visibly contributed to expand the housing options for people with disabilities, there are many other ways in which HUD initiatives are assisting the process of communitization. For example, the Section 232 Mortgage Insurance Program promises to be increasingly instrumental, especially once the program's new board and care regulations become effective.

In the area of direct subsidies, it is very important to note the increasing extent to which people with mental retardation and other disabilities have been entering a housing market less restrictive than the group home alternatives by participating in the Section 8 Rent Assistance Program and by utilizing public housing units.

However, the difficulties faced by people with disabilities in acquiring section 8 certificates while gaining access to public housing suggests the necessity of a set-aside or targeting for the certificates and requiring minimum numbers of accessible units in public housing facilities for disabled people.

The Congregate Services Program, slated for termination in the President's budget, has been a unique initiative by HUD to assure that those living in HUD facilities in the community will have the support necessary to maintain them in those less restrictive environments. A congressionally mandated report on the utilization and effectiveness of the program has been languishing in the Office of Management and Budget for over a year. Its publication would seem to be a necessary prerequisite to any determination of program viability.

Another program which has become increasingly important in spurring the development of necessary community services is the Community Development Block Grant Program currently hampered by a substantial deferral of operating funds for this fiscal year.

CDBG has been used to develop sheltered employment and training sites to promote entry or return to the work force people with disabilities.

Frequently, access to community-based housing alternatives, besides offering the person with disabilities the opportunity for more normalized and integrated living situations, frequently also results in a lessening of the Federal support dollars required for institution-based care. For that reason, we have noted with great concern the continuing drastic decline in Federal appropriations for assisted housing, by most estimates, over 50 percent during the last 5 years.

We decry this trend, and we submit that lack of executive leadership within HUD, as well as the administration's abandonment of many of the commitments which would appear to be embodied in the statutes authorizing our Federal housing programs, have been responsible for greatly exacerbating the Nation's housing crisis and escalating the problem of homelessness for many people, including individuals with disabilities.

Certainly, the need for appropriate and accessible housing has not diminished. The administration's current assault on assisted housing through the deferral of over $2.3 million for fiscal 1986 HUD appropriations, including the effective deferral of the loan authority for the section 202 program for the elderly and handicapped, is particularly repugnant, especially in the face of clear congressional disapproval of the administration's proposed cuts and program terminations last year.

Therefore, we have just two simple messages for the subcommittee at this time: First, act promptly to restore the fiscal 1986 funds deferred from HUD programs; and second, assure at least level funding for fiscal 1987. Although the real need far exceeds that amount for the next fiscal year, our recognition of the constraints imposed by dangerous deficit levels has tempered our request.

At the end of our testimony, you will find a summary of specific appropriations recommendations compiled by the ARC in conjunction with the 36 other national disability groups which comprise the Consortium of Citizens with Developmental Disability, the so-called CCDD. Copies of CCDD's analysis of the President's fiscal 1987 budget proposal and its recommendations for funding levels for those programs which most affect people with disabilities have been distributed to members of the appropriations and authorizing committees, and a single copy is submitted with today's testimony, which is this booklet here.

In the area of housing, specifically in the section 202, under section 8, congregate services, and the community development block grant programs, we are recommending that the current buying power of these programs be retained by funding them at the fiscal 1986 level plus the appropriate inflation interim.

Obviously, we are in strong opposition to the administration's proposed termination of the programs we have been discussing, and we challenge the notion that vouchers, even if there were sufficient numbers in them, are an adequate replacement for existing programs which fulfill the two-pronged housing need of providing rental subsidies and spurring new development as well as rehabilitation.

Furthermore, we find it very hard to believe that the administration has proposed the collapse into HUD all of rural housing assistance. The Department of Agriculture's Farmers Home Administration Program, through its section 515 and community facilities programs, has provided important impetus to development of community-based services in rural areas, including residential alternatives to people with disabilities.

The administration's proposed collapse of these and other FmHA programs into HUD with no plans for additional units or increased funding for an effective transfer of the administrative and programmatic responsibilities is irresponsible, at best.

ARC opposes the move on any grounds at this point, since rural program development, which has depended upon a decentralized system of planning and disbursement peculiar to the needs of the rural community, would be seriously threatened.

It seems imperative before concluding this testimony to return to a little further discussion of the section 202 program. The extension of the section 202 program to projects for the handicapped was an important statement of congressional concern for and willingness to invest in meeting the housing needs of people with disabilities. The continuation of that commitment must be validated by reversing the current deferral and by providing adequate funding for next year.

But the commitment must also be shown by support for a sorely-needed revision of the application of the section 202 program to the small, specialized projects for people with handicaps.

The handicapped projects continue to be burdened by inappropriate procedures and guidelines developed initially for the larger congregate facilities for the elderly. Despite some alterations, they are still quite inadequate for small, residential settings in single-family districts.

For example, topographical surveys and soil borings are only two of many items which are, at best, unnecessary, and which unreasonably forced up the overall construction costs frequently threatening project feasibility.

In addition, cost containment directives in recent years have met short-term cost reduction goals but forced longer term increased expenses. The arbitrariness of HUD's cost containment efforts last year extended to the insertion of what they call their double occupancy requirements for small group homes for the handicapped into the section 202 project guidelines.

Although congressional pressure was effective in causing HUD to reevaluate that directive and to offer some relief to endangered projects, they have yet to disseminate to the field the specific guidelines for determining financial feasibility. Moreover, it is unclear if the study of cost containment, fair market rent application, and other aspects of handicapped project development, as mentioned in the response to Congress and to disability community, is yet underway. If it is, it is proceeding without the participation of the disability community.

At this point, Mr. Chairman, I would like to note that the authorizing subcommittee, which I believe Chairman Garn is a member of, addresses many of these concerns very thoroughly, and we compliment that subcommittee to include, for example, the incorporation of the McKinney amendment from the House version into their version.

Although the purview of this subcommittee is limited to the appropriations process, it is imperative that those appropriations be channeled in an efficient and effective manner to assure that congressional intent and program implementation is upheld.

Therefore, we request your review of both the specific funding recommendations contained in our summary statement, as well as of the policy concerns raised in the rest of this narrative. We appreciate the opportunity to share with this subcommittee the pressing housing needs of all of the people who we represent.

I won't bother to read the summary of recommendations that we have.

Senator ABDNOR. We will make that a part of the record.

Mr. GOULD. We will just attach the written portion before the subcommittee.

Senator ABDNOR. And we will place your entire written statement in the record. I assure you, Mr. Gould, as you say, you are very knowledgeable, and Senator Garn is also very knowledgeable on this, being in both committees, and will give it due consideration. I am sorry we have to keep rushing along, but we have a schedule here.

Mr. Gould, we certainly thank you for being with us today on behalf of the Association of Retarded Citizens. You do a fine job of it. Thank you very much.

Mr. GOULD. Thank you.

[The statement follows:]

STATEMENT OF BENJAMIN A. GOULD, ASSOCIATION FOR RETARDED CITIZENS OF THE UNITED STATES

The Association for Retarded Citizens of the United States counts among its membership over 160,000 individuals across the nation who are, or speak on behalf of, the over six million United States citizens with mental retardation. Our priority concern, particularly in the last ten years, has been the establishment of community-based services for people with mental retardation and the concomitant deinstitutionalization of the large, frequently inhumane residential settings many have been forced to call home. Our efforts have, and continue to be greatly dependent on the availability of affordable, accessible community-based housing or an access to the means to develop such housing.

As a result, the people we represent, and those who provide for them, have come increasingly to depend on programs available through HUD to ,spur the development of and assure access to, community living options. In particular, the ARC, through its many affiliates, has become one of the largest sponsors of handicapped projects in the Section 202 loan program since its availability was expanded to programs for people with disabilities. We have found, as a 1984 report within HUD also concluded, that the private market in and of itself is not going to produce anywhere near sufficient housing to meet the needs of people with disabilities. For these people, contrary to Secretary Pierce's remarks before this subcommittee earlier this month, availability clearly continues to be as major an issue as affordability; thus the continuance of assisted housing programs which both provide rental subsidies and prompt new construction and rehabilitation is of dual concern to our constituents.

Although the Section 202 program has most visibly contributed to expanding the housing options for people with disabilities there are many other ways in which HUD initiatives are assisting the process of communitization. For example, the Section 232 Mortgage Insurance Program promises to be increasingly instrumental in helping to leverage private financing for living units for people with disabilities, especially once the program's new board and care regulations are finalized. In the arena of direct subsidies, it is of great importance to note the increasing extent to which people with mental retardation and other disabilities have been entering a housing market less restrictive than the group home alternatives by participating in the Section 8 Rent Assistance Program and by utilizing public housing units. The difficulties faced by people with disabilities in acquiring Section 8 certificates or gaining access to public housing suggests the necessity of a set-aside or targeting for the certificates and required minimum numbers of accessible units in public housing facilities.

The Congregate Services Program, slated for termination in the President's budget, has been a unique initiative by HUD to assure that those living in HUD facilities in the community will have the support necessary to maintain them in these less restrictive environments. A Congressionally mandated report on the utilization and effectiveness of the program has been languishing in the Office of Management and Budget for over a year. Its publication would seem to be a necessary pre-requisite to any determination of program viability. Another program which has become increasingly important in spurring the development of neccessary community services is the Community Development Block Grant program, currently hampered by a substantial deferral of operating funds for this fiscal year. CDBG has been used to develop sheltered employment and training sites to promote entry or return to the workforce by people with disabilities.

Access to community-based housing alternatives, besides offering the person with disabilities the opportunity for more normalized and integrated living situations, frequently also results in a lessening of the federal support dollars required for institution-based care. It is therefore with great concern that we have observed the continuing drastic decline in federal appropriations for assisted housing, by most estimates, over 50% during the last five years. We decry this trend, and we submit that lack of effective leadership within HUD as well as the Administration's abandonment of many of the commitments which would appear to be embodied in the statutes authorizing our federal housing programs have been responsible for greatly exacerbating the nation's housing crisis and escalating the problem of homelessness, including among people with disabilities. Certainly it is not the need for appropriate and accessible housing which has diminished. The Administration's current assault on assisted housing through the deferral of over $2.3 billion for FY 1986 HUD appropriations, including the effective deferral of the loan authority for the Section' 202 program for the elderly and handicapped, is particularly repugnant, especially in the face of clear Congressional disapproval during the 1986 appropriations process of the Administration's proposed cuts and program terminations last year. Therefore, we have two simple messages for the subcommittee at this time: act promptly to restore FY'86 funds deferred from HUD programs and assure at least level funding for FY 1987. Although the real need far exceeds a level response, our recognition of the constraints imposed by dangerous deficit levels has tempered our request. At the end of our testimony you will find a summary of specific appropriations recommendations compiled by the ARC in conjunction with the 36 other national disability groups which comprise the Consortium for Citizens with Developmental Disabilities (CCDD). Copies of CCDD's analysis of the President's FY 1987 budget proposal and recommendations for funding levels for those programs which most affect people with disabilities have been distributed to members of the appropriations and authorizing committees, and a single copy is submitted with today's testimony. In the area of housing, specifically in the Section 202, Section 8, Congregate Services, and in the Community Development Block Grant Program, we are recommending that the current buying power of these programs be retained by funding them at FY 1986 levels with an inflation increment.

Obviously, we are in strong opposition to the Administration's proposed termination of the programs we have been discussing, and we challenge the notion that vouchers, even if there were sufficient numbers of them, are an adequate replacement for the existing programs which fulfill the two-pronged housing need of providing rental subsidies and spurring new development as well as rehabilitation. Furthermore, we are incredulous that the Administration has proposed the collapse into HUD of all of rural housing assistance. The Department of Agriculture's Farmers Home Administration Program through its Section 515 and Community Facilities programs has provided important impetus to the development of community-based services, including residential alternatives to people with disabilities in rural areas. The Administration's proposed collapse of these and other FmHA programs into HUD with no incremental units or increased funding for an effective transfer of administrative and programmatic responsibilities is irresponsible at best. The ARC opposes the move on any grounds at this point, since rural program development, which has depended upon a decentralized system of planning and disbursement peculiar to the needs of the rural communities, would be seriously threatened.

It seems imperative, before concluding this testimony, to return to a further discussion of the Section 202 program. The extension of the Section 202 program to projects for the handicapped was an important statement of the Congressional concern for and willingness to invest in meeting the housing needs for people with disabilities. The continuation of that commitment must be validated by an overturn of the current deferral and the provision of adequate funding for next year. But the commitment must further be evidenced by support for badly needed revision in the application of the Section 202 program to the small, specialized projects for people with handicaps. The handicapped projects continue to be burdened by inappropriate procedures and guidelines developed initially for the larger congregate facilities for the elderly and, despite some alterations, still especially inadequate for small residential settings in single family districts. Topographical surveys and soil borings are only two of many items which are at best unnecessary and which unreasonably force up the overall construction costs frequently threatening project feasibility. In addition, cost containment directives in recent years have met short term cost reduction goals but forced longer term increased expenses. The arbitrariness of HUD's cost containment efforts last year extended to the insertion of their "double occupany" requirement for small group homes for the handicapped into the 85-9 Section 202 project guidelines. Although Congressional pressure was effective in causing HUD to re-evaluate that directive and to offer some relief to endangered projects, they have yet to disseminate the specific guidelines for determining financial feasibility to the field. Moreover, it is unclear if the study of cost containment, fair market rent application, and other aspects of handicapped project development addressed in the response to Congress and to the disability community is yet underway. If so, it is proceeding without the participation of the disability community.

Although the purview of this subcommittee is limited to the appropriations process, it is imperative that those appropriations be channeled in an efficient and effective manner to assure that Congressional intent in program implementation is upheld.

Therefore, we request your review of both the specific funding recommendations contained in our summary statement as well as of the policy concerns raised in the rest of the narrative. We are appreciative of the opportunity to share with this subcommittee the pressing housing needs of the people we represent.

SUMMARY OF RECOMMENDATIONS

The ARC respectfully submits the following recommendations to the Subcommittee on HUD - Independent Agencies of the Senate Committee on Appropriations:

- An appropriation for the HUD Section 202 Direct Loan program of $656.9 million to maintain the fiscal 1986 level of appropriations, plus an inflation factor, for housing developed for people who are disabled and elderly.
- Rejection of the Administration's plan to defer all Section 202 funding for new housing projects for this fiscal year.
- Support for significant cost-saving administrative changes in the Section 202 program that will separate standards and procedures for developing small group living arrangements from those used for large housing projects.
- Rejection of the Administration's proposal that rural housing programs currently administered by the Farmers Home Administration be maintained by HUD in future years.
- Sufficient appropriations in the Section 8 Housing Assistance Payments program in FY 1987 to cover loans made in connection with the Section 202 Loan program, and to continue funding rental assistance payments in both urban and rural areas at 1986 levels, with a 4.1% increase to cover the cost of inflation.

- Rejection of the Administration's proposal that the Section 8 program be converted to a system of vouchers.

- An appropriation of $4.27 million for the Congregate Housing Services program in FY 1987 to return it to its 1985 purchasing level.

- An appropriation of $3.25 billion for the Community Development Block Grant program in FY 1987, which would continue the program at FY 1986 funding levels, including a modest increase for inflation.

ENVIRONMENTAL PROTECTION AGENCY

STATEMENT OF KEN HAAG, DEPUTY COMMISSIONER, MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL QUALITY ENGINEERING, ON BEHALF OF THE NATIONAL GOVERNORS ASSOCIATION

ACCOMPANIED BY:

NICK NIKKILA, STATE DIRECTOR, MISSOURI AIR POLLUTION CONTROL PROGRAM, ON BEHALF OF STATE AND TERRITORIAL AIR POLLUTION PROGRAM ADMINISTRATORS

WILLIAM F. CASS, DIRECTOR, DIVISION OF HAZARDOUS WASTE, ON BEHALF OF ASSOCIATION OF STATE AND TERRITORIAL SOLID WASTE MANAGEMENT OFFICIALS

ROBBI J. SAVAGE, EXECUTIVE DIRECTOR, ASSOCIATION OF STATE AND INTERSTATE WATER POLLUTION CONTROL ADMINISTRATORS

Senator ABDNOR. Our next group is a panel: Ken Haag, the deputy commissioner from the Massachusetts Department of Environmental Quality Engineering, on behalf of the National Governors Association; Nick Nikkila, State director of the Missouri Air Pollution Control Program, on behalf of State and Territorial Air Pollution Program Administrators [STAPPA]; William Cass, director, division of hazardous waste, on behalf of Association of State and Territorial Solid Waste Management Officials [ASTSWMO]; and Robbi J. Savage, executive director, Association of State and Interstate Water Pollution Control Administrators [ASIWPCA].

I don't know what order you folks would like to go in, but I will let you be your own judge. You may proceed. Your entire statements will be made a part of the record. Proceed in any manner you care to.

Mr. HAAG. Thank you very much, Mr. Chairman. I am the Deputy Commissioner of the Massachusetts Department of Environmental Quality Engineering, and I am appearing here on behalf of Governor Anthony S. Earl, chairman of the National Governors Association Committee on Energy and Environment, and with me today here are representatives of the associations of State air, water, and hazardous waste management officials.

Senator ABDNOR. I know. Thank you.

Mr. HAAG. They will provide you with an assessment of the proposed EPA budget for their specific programs, but first, I would like to address EPA's State program budget in broad terms and express the Governor's strong recommendation that funds made available to State agencies not be reduced below fiscal year 1986 levels.

The Governors understand the dimensions of the budget problems facing the country today. They have adopted specific recommendations for reducing the Federal deficit. Reflecting their concerns, the Governors have approved a budget policy advocating a freeze at this year's level of the nondefense discretionary portion of the budget, including environmental regulation. This recommendation reflects the Governors' belief that public health and environmental protection are among the most important priorities of government and should not be subjected to reductions.

We are pleased that the President's request for the budget in fiscal year 1987 recognizes the greatly increased workload placed on State hazardous waste agencies as a result of the 1984 RCRA amendments. We encourage you to provide at least the additional $10 million the President has requested for State hazardous waste management programs.

However, we strongly oppose cutting any other State environmental program in order to more adequately fund the hazardous waste effort. We believe the President's request has the effect of inappropriately reducing support for State water programs with unfortunate consequences as the 1988 municipal compliance deadline approaches. And we urge you to provide each of the State management programs a level of support at least equal to last year's, with increases for waste and other programs where necessitated by increased spending requirements in States.

In making your decisions about the level of the EPA support in the coming fiscal year, it is important to keep several facts in mind; perhaps the most important is that State environmental agencies are the delivery arm for most of the Nation's environmental protection programs. It is the States which actually implement environmental programs, and in the words of EPA's task force on State-Federal relations, "If the States do not succeed out on the front lines, EPA cannot succeed."

We believe State grants represent the most efficient and cost-effective way of delivering environmental and public health protection services that the public demands. A second important fact is that in real terms, the level of Federal support of State programs has declined significantly in recent years. During that time, States have been asked to implement several new programs, including hazardous waste regulation, toxic waste cleanup, automobile inspection and maintenance programs, and enforcement of the Safe Drinking Water Act, on top of existing, understaffed programs.

In the past years, we have made management improvements in our programs. I believe that in the face of continuing reductions the effective level of Federal supports, States could be forced to reduce efforts; interstate consistency and program quality will suffer, and innovative approaches for controlling pollution, which are more expensive for States but can be much less expensive for business, they have to be shelved.

While some States might be able to reduce Federal support, many cannot. There are national environmental laws because protecting the environment and public health is in the national interest. Activities in one State can have an effect on the environment in another. And there is industrial competition from State to State and region to region. Each State should have the means to conduct a minimally effective regulatory program. Adequate Federal funding for these programs is a prerequisite to at least a minimum protection program across the Nation.

Finally, I believe it is very important to keep in mind the number of new environmental protection issues that will need attention in the future, including ground water protection, controlling nonpoint sources of water pollutants, acid rain, and toxins in all environmental media.

Controlling contaminants in ground water, especially drinking water supplies, will be a major new responsibility for the EPA and States under the terms of the safe drinking water conference agreement. Many of these new program initiatives are not currently funded. In the absence of additional Federal support beyond current levels, most States simply will not be able to meet these new challenges.

Mr. Chairman, we know that your task is a difficult one. The Governors, too, must wrestle with difficult budget decisions. But our sense is very strong that we cannot meet the expectations contained in Federal law while reducing the support for State environmental programs.

We will need another two decades of sustained work to achieve air and water quality standards to reduce acid rain and to clean up thousands of hazardous waste sites and to reduce toxic discharges into the air, the water, and on the land. The States are prepared to do their share. They have in the past, and with continued Federal support, we are confident of ultimate victory in the battle to protect environmental quality and public health.

Thank you for the opportunity to testify.

Senator ABDNOR. Thank you.

[The statement follows:]

STATEMENT OF KENNETH HAGG, DEPUTY COMMISSIONER, MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL QUALITY ENGINEERING

Mr. Chairman, members of the Subcommittee, I appreciate the opportunity to appear before you this morning on behalf of Governor Anthony S. Earl, Chairman of the National Governors' Association Committee on Energy and Environment. With me today are representatives of the associations of state air, water, and hazardous waste management officials. They will provide you with an assessment of what the proposed EPA budget means for their specific programs. I would like to address the EPA's state program budget in broad terms, and express the governors' strong recommendation that the funds made available to state agencies not be reduced below FY 1986 levels.

The Governors understand the dimensions of the budget problems facing the country today, and have adopted specific recommendations for reducing the federal deficit. Reflecting their concerns, the Governors have approved a budget policy advocating a freeze at this year's level of the non-defense discretionary portion of the budget which, includes environmental regulation. This recommendation reflects the Governors' belief that public health and environmental protection are among the most important priorities of government, and should not be subjected to reductions.

We have noted with satisfaction that the President's request recognizes the greatly increased workload placed on state hazardous waste agencies as the result of the 1984 RCRA amendments. We encourage you to provide at least the additional $10 million the President has requested for state hazardous waste management programs. However, we strongly oppose cutting any other state environmental program in order to adequately fund the hazardous waste effort. We believe the President's request has the effect of inappropriately cannibalizing state water programs, with unfortunate consequences as the 1988 municipal compliance deadline approaches. We urge you to provide each of the state management programs a level of support at least equal to last year's, with increases for waste or other programs where necessitated by increased federal requirements on states.

In making your decisions about the level of EPA support in the coming fiscal year, it is important to keep several facts in perspective. Perhaps most important, state environmental agencies are the delivery arm for most of the nation's environmental protection programs. It is the states which actually implement environmental programs, and in the words of the EPA's Task Force on Federal-State Relations, "If the states do not succeed out on the front lines, EPA cannot succeed." The significant point is that EPA's state program grants do not represent grants in the usual use of that term. Rather, they represent the purchase of required environmental protection services in a form and manner mandated by the federal government. We believe these state grants represent the most efficient and cost effective way of delivering environmental protection and protecting public health.

A second important fact is that in real terms the level of federal support for state programs has declined significantly in recent years. We estimate that the Administration's fiscal 1987 request for state programs represents more than a 65 percent decrease in real terms since 1975. During that time period, states have been asked to implement several new programs including hazardous waste regulation, toxic waste cleanup, auto inspection and maintenance, and enforcement of the Safe Drinking Water Act -- on top of the existing understaffed programs.

In the past several years, we have made management improvements in our programs, and any further cuts would require major program reductions. In the Governors' view, we simply cannot absorb any further reductions without endangering these programs. I believe that in the face of continuing reductions in federal support, states could be forced to reduce efforts; interstate consistency and program quality may suffer; and innovative approaches for controlling pollution, which are more expensive for states but can be much less expensive for business, may have to be shelved.

It is also important to reject the notion that states can make up for reductions in federal support. The simple truth is that they cannot. The preliminary results of a survey conducted by National Governors' Association and the National Association of State Budget Officers show that aggregate state budget surpluses in fiscal 1987 will be extremely low -- just 1.6 percent of total state expenditures. This is considerably below the 5 percent considered prudent by Wall Street bond and investment houses. In FY 1986, 17 states have cut previously enacted budgets. Conditions are especially difficult in those states which rely upon farming or extractive industries such as oil and mining. The fiscal outlook for most states remains guarded, and few states are able to recommend new spending initiatives or increase spending to make up for federal cuts.

While some states might be able to replace federal support, many cannot. There are national environmental laws because protecting the environment and public health is in the national interest. Activities that in one state can affect the environment in another. There is industrial competition from state to state and region to region. Each state should have the means to conduct a minimally effective regulatory program. Adequate federal fundings for these programs is a prerequisite to at least a minimum program across the nation.

The Governors also believe that permit fees can account for only a small part of environmental program funding. In the majority of states that collect permit fees for environmental programs, the revenues are deposited in the general fund. In most states, it has historically been considered good public policy to place such revenues in the general fund to avoid the appearance of conflict of interest between regulators and pollution sources. According to a 1982 study of state environmental programs conducted by National Governors' Association, about 21 states and territories charge for air quality permits, but in only 10 are the funds available to the permitting agency. While 22 states and territories have water quality permit fees, only 9 states make them available to the permitting agency; and only 7 hazardous waste agencies collect and keep permit fees even though 18 agencies collect them. In addition, permit fees generally account for less than 10 percent of an agency's program funds.

Finally, I believe it is very important to keep in mind the number of new environmental protection issues that will need attention in the future, including ground water protection, controlling nonpoint sources of water pollutants, acid rain, and toxics in all environmental media. Controlling contaminants in groundwater, especially in drinking water supplies, will be a major new responsibility for the EPA and states under terms of the Safe Drinking Water conference agreement. Many of these new program initiatives are not currently funded. In the absence of additional federal support beyond current levels, most states simply will not be able to meet these new challenges.

Mr. Chairman, I know your task is a difficult one. The Governors, too, must wrestle with these difficult budget decisions. But our sense is very strong that we cannot meet the challenge by reducing the support for state environmental programs. We will need another two decades of sustained work to achieve air and water quality standards, reduce acid rain, clean up thousands of hazardous waste sites, and reduce toxic discharges into our air and water and on our land. The states are prepared to do their share, and with continued federal support we are confident of ulitmate victory in the battle to protect environmental qualty and public health.

Senator ABDNOR. I would like to next turn to Mick Mikkila, who is representing the State air pollution control programs.

Senator ABDNOR. Mr. Nikkila?

Mr. NIKKILA. Thank you, Ken.

Senator Abdnor, my name is Nick Nikkila, and I am the staff director of the Missouri Air Pollution Control Program. I appear before you today on behalf of the State and Territorial Air Pollution Program Administrators [STAPPA], where I currently serve as a member of the board of directors, and the Association of Local Air Pollution Control Officials [ALAPCO].

STAPPA and ALAPCO are the national associations of air pollution control agencies in the 54 States and territories and more than 150 major metropolitan areas whose members are responsible for implementing our Nation's air pollution control laws and regulations.

I am grateful for this opportunity to present the association's views on the Environmental Protection Agency's Federal budget request for State and local air agencies under section 105 of the Clean Air Act.

I would also like to express a special thanks to the committee staff for being so accommodating to our association's desire to provide testimony to you. You have been provided with a copy of my written presentation, which covers some areas in more detail than my time before you today will allow.

Senator ABDNOR. Let me assure you, Nick, we will put your entire statement in the record.

Mr. NIKKILA. I appreciate that, Senator. I would like to use this time, then, to cover the main points provided in that presentation. I imagine much of the testimony you have heard in recent days has been designed to show the importance of the program involved and the need for additional funding. You will hear some of that from me, as well, but first, I want to tell you that STAPPA and ALAPCO support the President's proposed budget request of $95 million for grants in fiscal year 1987 to State and local air pollution control agencies under section 105 of the Clean Air Act.

It is not easy to support this further decrease in our funding, but the members of STAPPA and ALAPCO acknowledge the President's efforts to develop an equitable budget and the efforts of both the administration and the Congress to reduce the size of the Federal deficit.

From your perspective, that may be the most important point of my presentation. From our perspective, it is equally important that you understand the size of the air quality task ahead of us and the future resource needs if we are to be successful in this effort.

In regard to purchasing power, STAPPA and ALAPCO have experienced a 21-percent decrease in the Federal contribution since 1972. In spite of that, we have developed and implemented control plans for the criteria pollutants; taken on new Federal programs for new source performance standards; prevention of significant deterioration; national emission standards for hazardous air pollutants and, in some cases, developed and initiated needed control programs when Federal leadership was lacking.

Those efforts resulted in a more healthful air quality for our citizens. Between 1978 and 1984, the number of unhealthful areas has been reduced by 25 percent for particulates; 35 percent for sulfur dioxide; 27 percent for carbon monoxide; 35 percent for ozone; and 67 percent for nitrogen dioxide.

Additionally, the air quality in most of the remaining unhealthy areas is improving. Even once the criteria pollutants have been controlled to healthful levels, we must maintain the resources and level of effort necessary to ensure against backsliding.

In addition, we have an even greater set of hurdles immediately ahead of us. We must take action to limit atmospheric emissions of the toxic compounds to safe levels. The size of that task alone is almost overwhelming. In many cases, we don't even know what level can be considered as safe. Indoor air pollution is another extremely important area that must be addressed.

The ever-present resource requirement of acid rain control must be recognized, as well. None of what has been accomplished has been easy, and the hardest is still ahead. We are not sitting idle, bemoaning our fate until Federal moneys are increased. Many of us either have developed or are attempting to develop fee programs to mitigate our losses.

It must be recognized, however, that a State or local agency's ability to compensate for decreased funding and lost purchasing power is limited.

While we will continue to do the best we can with what is available, there is an increasing gap between what the public expects of many of our agencies and what these agencies can deliver. However, as both citizens and responsible government officials, we recognize the need to make sacrifices to reduce our Nation's deficit.

We, therefore, support the President's request for $95 million to fund State and local air pollution control programs and ask that you remember our efforts in the future budget deliberations.

Thank you for the opportunity to testify today, and I will try and answer any questions you might have.

[The statement follows:]

STATEMENT OF NICK NIKKILA, STAFF DIRECTOR, MISSOURI AIR POLLUTION CONTROL PROGRAM, ON BEHALF OF THE STATE AND TERRITORIAL AIR POLLUTION PROGRAM ADMINISTRATORS

Mr. Chairman, members of the Subcommittee, my name is Nick Nikkila and I am the Staff Director of the Missouri Air Pollution Control Program. I appear before you today on behalf of the State and Territorial Air Pollution Program Administrators (STAPPA), where I currently serve as a member of the Board of Directors, and the Association of Local Air Pollution Control Officials (ALAPCO). STAPPA and ALAPCO are the national associations of air pollution control agencies in the 54 states and territories and more than 150 major metropolitan areas, whose members are responsible for implementing our nation's air pollution control laws and regulations. I am grateful for this opportunity to present the associations' views on the Environmental Protection Agency's federal budget request for FY 1987 and, in particular, on the amount requested for state and local air agencies under Section 105 of the Clean Air Act.

STAPPA and ALAPCO support the President's proposed budget request of $95 million for grants in FY 1987 to state and local air pollution control agencies under Section 105 of the Clean Air Act. This level of funding will make effective management of some state and local air pollution programs difficult, but the members of STAPPA and ALAPCO acknowledge the President's efforts to develop an equitable budget and the efforts of both the Administration and Congress to reduce the size of the federal deficit.

Federal grants provide approximately one-third of the total funding of state and local air pollution control agencies. The FY 1987 federal budget request is, in actual dollars, $700,000 less than the amount state and local agencies received from Congress in FY 1986. This reduction continues the erosion of federal funding that has occurred over the past decade.

Since the Clean Air Act was last revised, federal support has not only failed to keep pace with inflation but, in terms of real dollars, has declined by over 20 percent. This has occurred in spite of the fact that state and local agencies have taken on considerable new responsibilities since the act was last amended. These have ranged from implementing federally-delegated programs for New Source Performance Standards, Prevention of Significant Deterioration and hazardous pollutants to developing and enforcing State Implementation Plans for the various criteria pollutants. In effect, state and local air pollution control agencies are charged with implementing programs to meet today's needs with a federal funding level (in real dollars) less than that of 1972. To illustrate these points, attached to this statement are tables (1) listing many of the the responsibilities that state and local agencies have assumed since the Clean Air Act was passed and (2) detailing federal and non-federal funding of state and local air pollution control programs in terms of actual and real dollars since FY 1972.

In spite of budgetary constraints, state and local air agencies have made tremendous achievements under the Clean Air Act in improving the quality of our nation's air. The number of areas exceeding the health-based air quality standards for criteria pollutants has decreased significantly. According to a June 1985 EPA report (State and Local Air Program Resources Study), between 1978-1984, the number of nonattainment areas has been reduced by (1) 25 percent for particulates, (2) 35 percent for sulfur dioxide, (3) 27 percent for carbon monoxide, (4) 35 percent for ozone and (5) 67 percent for nitrogen dioxide. In addition, the concentrations of these pollutants in the remaining nonattainment areas appear to be on the decline.

While we are proud of these and other successes, we must remain diligent in our efforts to maintain these achievements. Air quality improvements occur primarily by limiting the rate at which pollutants are emitted into the atmosphere. Without continuing oversight and enforcement, control efforts deteriorate and past gains are not maintained. Prudent use of precious funds can make maintenance of past gains possible in the short run, but important problems still remain and new ones constantly emerge to challenge us.

Despite the progress we have made in improving the quality of our ambient air, millions of people are still exposed to unhealthy levels of pollutants. We continue to face a ubiquitous ozone problem. Roughly 35 cities throughout the nation, containing over 80 million people, are projected to exceed the health-based standard for ozone beyond the 1987 Clean Air Act deadline. Unfortunately, most of the easy reductions have been achieved. We are now faced with requiring controls that are not only expensive for industry to comply with, but costly for state and local agencies to implement. Moreover, EPA is considering requiring agencies to upgrade monitoring networks, develop emissions tracking systems, improve the effectiveness of vehicle inspection and maintenance programs and enhance enforcement programs by conducting more frequent inspections of a greater number of facilities. We are also confronted by a similar post-1987 nonattainment problem with carbon monoxide, which will likewise require increased efforts by state and local agencies.

Reducing the risk of exposure to air toxics will also require significant expenditures. Most state and local air agencies are at the embryonic stage in developing programs to control both routine and accidental releases of toxic chemicals. To make progress, agencies will be required to hire additional personnel, purchase equipment, inventory chemical plants and industrial facilities and conduct inspections. Expansion of these activities will occur slowly, or not at all, if funding levels are not raised.

State and local agencies will also face significant difficulties in implementing EPA's often-postponed fine particle standard, expected to be promulgated in FY 1987. EPA has projected that about 100 areas, containing 20 million people, will exceed the revised particulate standard. State and local agencies are being required to purchase and operate special PM_{10} monitors during FY 1987 and to submit a comprehensive plan to EPA soon after the new standard is published.

Substantial commitments of resources will be necessary for state and local agencies to assume responsibility for a host of other activities. These range from purchasing additional monitors for the criteria pollutants (50 percent of existing monitors are in "fair" or "poor" condition, according to EPA) to completing court-mandated stack height regulations and State Implementation Plans (SIPs) for visibility.

One additional area of the EPA budget typically lacking adequate resources is training. State and local officials have historically relied to a great extent on EPA's training program. Our agencies are at a distinct disadvantage when forced to compete with private industry for qualified personnel. Turnover in the public sector tends to be high and training replacements is costly. In addition, existing personnel must be kept current in their fields and apprised of new regulations and requirements. STAPPA and ALAPCO therefore urge you to ensure that the training program for air pollution control is adequately funded.

These are somewhat frustrating times for state and local air pollution control agencies. We are facing increased work loads at the same time our funding is declining. The problem is particularly trying for many local agencies, which have relied in the past on federal revenue sharing. We are attempting to cope, however, by conserving resources in a number of ways. Many agencies have instituted internal administrative and managerial cut-backs to create a leaner organization. Others have postponed filling vacancies or replacing old equipment. However, these cost-saving measures alone have not been sufficient to compensate for continual increases in responsibility and decreases in the purchasing power of federal funding. Accordingly, agencies are also seeking funding from alternative sources.

One alternative source of funding is the permit fee, which allows air pollution control agencies to impose charges on a regulated facility in order to recoup the administrative costs of issuing and enforcing permits for that facility. We are currently in the process of surveying state and local agencies on their fee systems and are able to share with you our preliminary results. Of the 27 states responding to our survey to date, 26 currently have or will soon gain the authority to collect fees. Over half of the respondents indicated that they already collect fees, although the average amount of fees collected represents only 10 percent of a state agency's budget. It seems reasonable to expect greater reliance on fees in the future unless some alternative source of funding emerges.

State and local air pollution control agencies feel an acute responsibility for protecting public health and the environment. We are sincere in our efforts to operate efficiently and supplement our budgets; however, an agency's ability to compensate for decreased funding and lost purchasing power is limited. While we will continue to do the best we can with what is available, there is an increasing gap between what the public expects of many agencies and what these agencies can deliver. However, as responsible government officials, we recognize the need to make sacrifices to reduce our nation's deficit. We therefore support the President's request for $95 million to fund state and local air pollution control programs.

Thank you for this opportunity to testify today. I will try to answer any questions you have.

TABLE 1

PROFILE OF STATE CLEAN AIR RESPONSIBILITIES OVER THE YEARS

1963	CAA charge to "develop, establish and improve air quality programs"
1966	CAA "maintain" existing air programs
1967	AQA designation of AQCRs promulgation of state AAQS state enforcement of air pollution statutes develop AQ comprehensive strategies and deliver to HEW
1970	CAAA
1971	NAAQS set by EPA
1972-74	O_x, CO, NO_x, TSP, SO_2 SIP development and submittal TCPs I/M ISR NSR
1974-75	Attainment deadline TSP and SO_2 Maintenance Plans
1976	§110 (a) (2) (H) O_x Replanning Calls Offset Policy
1977	CAAA
1977	§124 Interstate Notification §107 N/A Designations State Board Composition Non compliance penalties Part C PSD Class I designations
1978	§174 Designations Development of VOC RACT regs Development of Part D plan elements Seek legal authority for I/M EPA doing PSD and NSINA permitting pending State delegations
1979	Part D SIPs due for TSP, SO_2, NO_x O_3 and CO in 50 States otherwise §110 (a) (2) (I) construction ban consequences NSR regs due Lead SIPs due TCPs, BTN and §176 (c) statements due Bubble Policy announced
1980	Visibility SIPs due to EPA §121 Consultation regs due Part C PSD requirements published 1979 SIPs approved §319 monitoring SIP due
1981	State PSD regs and delegations increase State NSPS and NESHAP delegations increase 1982 SIP CO and O_3 development activities Generic State Bubble rules allowed
1982	Part D SIPs for O_3 and CO extension areas in 31 states due Attainment date for all nonextension areas Proposed Emission Trading Policy Announced
1983	EPA publishes SIP approvals/disapprovals EPA publishes Tier 1 and Tier 2 lists for attainment compliance NRDC Pb Suit SIPs due Post 82 SIP and Sanction Policy published
1984	Post 82 SIP work §110 (a) (2) (H) calls for SIP replanning State/EPA air audits PM_{10} NAAQS proposed Development of State Air Toxics programs Acid rain research GEP stack height case settled, SIPs due soon Visibility FIPs

SOURCE: State and Local Air Program Resources, United States Environmental Protection Agency, June 1985.

TABLE 2

FUNDING FOR STATE AND LOCAL AIR POLLUTION CONTROL PROGRAMS
(Millions $)

FY	Purchasing Power	Non-Federal Actual	Non-Federal *Real	Federal Actual	Federal *Real	Total Actual	Total *Real	% Non-Federal
72	1.00	55.0		42.0		97.0		57
73	.95	63.1	59.9	50.7	48.2	113.8	108.1	55
74	.88	76.7	67.5	51.5	45.3	128.2	112.8	60
75	.78	91.2	71.1	52.5	41.0	143.7	112.1	63
76	.74	94.7	70.1	55.3	40.9	150.0	111.0	63
77	.70	104.8	73.4	55.6	38.9	160.4	112.3	65
78	.64	107.9	69.1	66.0	42.2	173.9	111.3	62
79	.62	116.3	72.1	80.0	49.6	196.3	121.7	59
80	.55	132.1	72.7	82.8	45.5	214.9	118.2	61
81	.49	143.9	70.5	87.7	43.0	231.6	113.5	62
82	.48	144.9	69.6	87.7	42.1	232.6	111.7	62
83	.45**	151.0	68.0	84.7	38.1	235.7	105.5	64
84	.43**	157.2	67.6	87.7	37.7	244.9	105.3	64
85	.42***	171.5	72.0	90.7	38.1	262.2	110.1	65

* Real purchasing power of the dollar, valuing the 1972 dollar at $1.00 and rating the purchasing power of each subsequent year's dollar against the 1972 dollar. Source: United States Department of Commerce

** Estimates--Data Resources Incorporated

*** Estimate--United States Department of Commerce

SOURCE: U.S. Environmental Protection Agency/Office of Air Quality Planning and Standards/Massachusetts Department of Environmental Quality Engineering/Division of Air Quality Control

Senator ABDNOR. Thank you. Anyone else?

Mr. HAAG. Next we will have Bill Cass, representing the Association of State and Territorial Solid Waste Management Officials, ASTSWMO.

Mr. CASS. Thank you, Mr. Chairman. I appreciate the opportunity to provide you with some of our perspective. ASTSWMO represents the State solid hazardous waste directors and their staff, and as such, we are really on the front line of trying to deal with the regulated community and the public on the issues of hazardous waste. As you perhaps know, many of the State programs were out ahead of and anticipated the RCRA amendments and, in many instances, had programs that were broader in scope as well always more stringent than the EPA programs.

I would like to preface my remarks by reinforcing some of what Ken said, and that is that we are certainly not here to complain, because the hazardous waste programs, compared to the other environmental programs, and compared with what is having to go on in general in a time of very tight budget situations, had an increase of roughly $7.5 million.

I would, however, like to share with you some of our worries and to give you some of our perspective about what we see happening here.

In particular, what is happening with the amendments is that the gap between what is feasible, what reality is in terms of what we can do, and what the public expects and what the legislative expectations are is continuing to widen to the point where that really concerns us.

There is a problem of credibility in these programs, as well as just the reality of meeting the deadlines. There is something like, as you perhaps know, 67 regulatory deadlines in 4 years. The tendency of EPA—and the States, too, for that matter—is going to try to meet those deadlines. That puts everything under a tremendous amount of stress. It is very difficult for us, just in the program development area, to keep up with the things that EPA is trying to do and to ensure that we have a quality input and quality participation in making sure those programs are going to be workable.

Many of the things that are spelled out in these amendments, as well as in the basic legislation, represent what I can only call a fairly huge undertaking. There the a whole problem of land disposal and major facility permitting that, of course, is continuing on as one of the highest priorities.

But the problem of having the license and, where necessary, to line land disposal facilities by 1988, is certainly a large one. There is a continuing backlog of change of status facilities in clean closures, payers that changed their status, that changed their license or decided to close, and the proper monitoring of those places. There is a continuing concern for nonnotifiers.

I will be very brief. Just to try to put this in perspective a little bit, on these solid waste management units, using EPA's estimates, we took the number of solid waste management units, estimated to be about 2,000 licensed facilities out there, and EPA judges that maybe roughly 70 percent of those facilities out there have management units that need to be dealt with in their estimates of what it takes to properly scope and do a manifest on those things and to do the preliminary workup necessary to try to deal with them from a licensing standpoint.

They estimate that at probably $25,000 a facility. That is the median of what they estimate. That comes out to $35 million. That is only one of the new issues that we have to address.

EPA is now working, and we give them a lot of credit for it, very vigorously to set some priorities based on health risks, threat to health. When they do that, I think that, at least it is clear to me, under any objective ranking system, problems of small quantity generators and waste oil burning, use of wastes as a fuel is going to come out very high in any objective ranking in terms of trying to decide what we should put our priorities on.

Those efforts are largely funded. There is only a token, very small funding available to deal with those issues.

The whole problem with waste oil is one where, because of reducing, depressed prices of oil itself, the whole system is running amuck in the sense that what oil collectors used to pay to take away, they are now going to have to charge for, which is going to greatly increase the tendency of people to want to dump this stuff rather than have to pay to get rid of it.

So there is a whole area of worry that isn't adequately addressed in these budgets. To wrap up, I would just say that while yes, it is true that some States have relatively good budget situations, there are certainly others that don't.

In many of those States, including Massachusetts that do have a fairly good budget situation, we are already paying, investing better than twice what the Federal share of the program is, which really more than offsets any kind of increase any reasonable person would expect in that area, and we are already contributing greatly to the completion of the Federal priorities as well as some of the others that I mentioned.

So all I am trying to say, really, is to keep this in perspective, there are many, many new charges under the new amendments. The size of the regulated community has grown huge with the addition of small quantity generators. We are up to 630,000 versus 14,000. When you try to look at the staffing and the resource requirements related to that, the arithmetic just plain doesn't work.

I think we have a continuing gap that we have to deal with.

[The statement follows:]

STATEMENT OF WILLIAM F. CASS, DIRECTOR, DIVISION OF HAZARDOUS WASTE, MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL QUALITY ENGINEERING, ON BEHALF OF THE ASSOCIATION OF STATE AND TERRITORIAL SOLID WASTE MANAGEMENT OFFICIALS

Mr. Chairman, Members of the Subcommittee, my name is William Cass and I am the director of the Division of Hazardous Waste in the Massachusetts Department of Environmental Quality Engineering. I currently serve as President of the Association of State and Territorial Solid Waste Management Officials (ASTSWMO), and am pleased to testify on behalf of the Association as to how the Administration's FY87 budget proposal for USEPA affects the States' ability to implement solid and hazardous waste program requirements.

ASTSWMO is a non-profit professional association which speaks for the directors of State solid and hazardous waste regulatory and cleanup programs. Situated at the State level, our members have a unique perspective on the problems of waste management. State officials are in constant contact with the individuals who produce and handle potentially health threatening wastes. They are the first to hear the concerns of citizens living near areas of actual and potential contamination.

Our members play an essential role in ensuring that solid and hazardous waste is generated and disposed of in a safe manner. In addition to ensuring State program compliance with federal requirements, State officials must satisfy State solid and hazardous waste management rules. In many instances, these State requirements may be more stringent than the federal requirements. In addition to the regulation of hazardous waste, States also contribute funds, staff time, and other resources to clean up Superfund sites and other State sites which do not make the federal list of priority sites; to regulate underground storage tanks; and to regulate non-hazardous waste activities.

State Solid Wastes directors wish to applaud the significant attention paid to solid and hazardous waste management in the Administration's proposed FY87 budget. The Environmental Protection Agency's request for an increase in state grants under §3011 of the Resource Conservation and Recovery Act is appreciated. As you know, the President's request is for a total of $7,494,000 with $2,494,000 of that replacing the funds that were cut by the 4.3% mandated by the Gramm-Rudman-Hollings Act this fiscal year and $5,000,000 in new money for direct program implementation. States were also pleased with the addition of $3,000,000 for the underground storage tank program, which is administered in half of the States by our members. While these increases and additions begin to recognize increased program responsibilities, it should be remembered that they do not significantly address all of the new features added by the Hazardous and Solid Waste Amendments of 1984 (HSWA).

The States' need for this new money is great. Many of the new federal regulations required by the Hazardous and Solid Waste Disposal Act of 1984 (HSWA) will be ready to implement in FY87. For some States, these new amendments will allow an ongoing State program to be recognized as an integral part of the national program. Yet for the majority of the States, the HSWA requirements will be new components of an already overcommitted regulatory effort. By greatly increasing the scope of the regulated universe, HSWA will require additional resources of State governments which have the federal program delegated to them.

I would like to share with you an example of how this added money can be used to cover new HSWA requirements. Even in the narrow universe of disposal facilities, a new initiative under HSWA covering solid waste management units (SWMUs) will demand increased resources. USEPA estimates that up to 70% of the land disposal facilities, 80% of the incinerators, and between 50-60% of the storage facilities have SWMUs. Each of these facilities may have 1 to 600 units, with an average of 6. The SWMUs represent new portions of a facility which have previously not been addressed under Subtitle C of RCRA.

Regulation of SWMUs involves the permit writer doing a file search, reviewing aerial photos of the sites, interviewing the owner or operators of the facility, and interviewing the public to do a historical tracking of the use of the site. This preparatory work may take weeks to complete. After completion of this step, the permit writer goes to the facility for a site review. Such a review may involve extensive sampling to show whether the SWMU is causing environmental problems. The preparatory work and the site review, including the sampling, is currently averaging $20,000 to $30,000 per facility.

If contamination is suspected, then the owner/operator of the facility is directed to do much more extensive site characterization work, either under a corrective action (§3008(h))or as a permit condition. Once the problems are adequately characterized, the facility owner must agree to cleanup the site in order to maintain his permit. This new regulatory initiative is well worth the money. It identifies and forces cleanup of potential Superfund sites during the permit process. Slowness due to understaffing and insufficient funds will cause permit delays. The proposed increase in State grants would provide more money for efforts such as this.

In addition to pointing out new actions at the facilities that the Administrator's budget attempts to address, State directors would like to share with you some additional initiatives which provide excellent payout for minimum investment that go beyond the President's budget. Acknowledging the concerns of your Subcommittee for prudent expenditures in all programs under your jurisdiction, ASTSWMO is hopeful that this information may be of use to you.

According to State directors, only forty percent of the universe covered by the Resource Conservation and Recovery Act is addressed by facility specific efforts. A major portion of the expanded universe under HSWA is composed of generators (small quantity generators and waste oil blenders, for example). The addition of small quantity generators under HSWA to the federal regulatory universe has increased the nationwide numbers from 14,000 to 630,000. That is 45 times those regulated before HSWA! Compare those numbers for generators with less than 2,000 treatment, storage, and disposal facilities (TSDFs).

States agree that both public health and the environment can be threatened by the generators and shippers of hazardous wastes, in addition to the disposal facilities. Under the proposed FY87 budget, once the facility specific efforts are identified, little money remains to monitor the bulk of the regulatory community. For example, after addressing baseline TSDFs requirements, the remaining FY87 grant funds would only cover 2% of the generators. That is only one inspection of each generator every 50 years.

The federal program has relied in the past on voluntary reporting by the generators to the regulatory agencies. As the regulations become more stringent, fewer generators will voluntarily report. For that reason, States have found that emphasis must be placed on these "non-notifiers" to maintain a comprehensive identification of the regulated universe. This totally unregulated source of pollution can only be addressed by following up on citizen complaints, sending inspectors out to areas when waste may be generated and disposed on site, and other manpower intensive efforts.

However, the payout is great. Instead of waiting to discover generators who have been pouring their wastes either down the drain or on a secluded part of their property under CERCLA, targeting non-notifiers will encourage all generators of hazardous waste to report. With adequate funding, States could utilize a technique that has been quite successful when implemented by the Internal Review Service. As you know, the IRS relies on publicity about heavy fines/jail sentences levied against individuals who have never reported to encourage persons to voluntarily come forward. That same technique, with adequate funding, can be used in RCRA.

Manifest tracking is one way that the States can monitor the generators... unfortunately, the FY87 budget does not provide adequate money for some States to institutionalize such a system or for others to computerize such a system. Yet, investment in this system is very cost effective. For example, the State of New York, handling 3,000 manifests a week, has computerized using two key punch operators. Since the State has automated its system the number of exception reports (when the State does not receive information from both the generator and the disposer -- the cradle to grave coverage offered by RCRA) has decreased from 600 per month to 200 per month. This has allowed the State to more effectively target enforcement resources to those generators or disposal facilities who are not meeting federal requirements. Other State manifest workloads include Louisiana with 700-1,200 per week, Illinois with 1,300 per week, and New Jersey with between 1,600 and 2,000 a day.

In closing, the first tier of regulation, that of the facilities, is emphasized under the proposed FY87 budget. However under the same proposed budget, this second tier of regulation which targets the source of the hazardous waste is not reflected. It is this "safety net" of control which your Subcommittee may wish to consider when determining additional funding for our program.

Senator Abdnor. Thank you, Mr. Cass. You stated it very well. We will waive the magic wand and solve everyone's problems. That would be nice. We will certainly take a hard look.

I guess we save the best and prettiest for last. Robbi Savage, executive director of—you tell me.

Ms. Savage. To end the alphabet soup, yes. My name is Robbi Savage. I am the executive director and the secretary-treasurer of the Association of State and Interstate Water Pollution Control Administrators; we call it ASIWPCA.

Senator Abdnor. That isn't so tough after all when you hear it. Thank you.

Ms. Savage. Thank you. You should have to answer the phone with the names we have.

Normally, Senator, we come before this committee to talk about successes in the clean water program. We have had the opportunity to do that with results between 1972 and 1982 as documented in our report, "America's Clean Water, the States' Evaluation of Progrems."

Until this year, the administration and, certainly, this body, have been very generous in supporting the clean water effort with the funding and with the necessary authorization. We appreciate very much the opportunity to come and talk to you, especially since this time, we are not going to talk so much about successes, but more about the need that the clear water has for your support in order to survive, basically, and to perpetuate a level of effectiveness that we have enjoyed over the last several years.

I, too I would like to add our appreciation to Senator Garn and his staff for providing us the opportunity and working with us to be here today. You have an outstanding staff and we enjoy working with them very much.

Over the years, Senator, you have placed a lot of trust in the States. We believe that trust has been justified, and we returned the kind of results in all the media programs you have asked for us.

Ken mentioned the partnership with EPA is vital, but when one of the partners is shortchanged—and yet we are asked to do the same level of work—there is a discrepancy that makes it very difficult for us to proceed.

With the President's fiscal year 1987 budget, the potential is that we will greatly retard the States' ability to manage their clean water programs and to move forward successfully to do what the Congress and the American people are demanding that we do.

Senator, you have been a long proponent of the clean water program as well as water resources, and you know well the status that we are living under in this program. Just to very quickly recap, the fiscal year 1986 clean water program for construction grants was authorized at a $2.4 billion level. It was also appropriated at that amount, but only $600 million has been released so far.

This has been done, as you are keenly aware, as a spur to the authorizing committees to get them moving with full reauthorization, and we appreciate that concept. However, we are obviously running into some problems with only $600 million being available for the program.

The 1987 situation is less encouraging for us. President Reagan has not authorized or requested any money of this body or the authorizing committee for the clean water program for construction grants until and unless adequate reauthorization takes place.

Now, what his interpretation of "adequate reauthorization" is, we are not wholly certain. But we do know the President's request of $1.8 billion, which is a $600 million decrease from last year, will not provide us the kind of results that we need.

We very much appreciate what you are trying to do in withholding the funding, but we are tasked with transferring this program from the federally dominated construction grants program to one that is State self-sufficient, using a mechanism, the State revolving loan funds.

If the construction grants money is not made available to the States in a consistent amount, we propose $2.4 billion as a continuation over a significant period of time. President Reagan's 4-year period is not a significant amount of time. You can't build a program like this in a 10- or 12-year period and eliminate it in 4 years and expect to have a quality program.

So basically, Senator, we need your help. The President is proposing a 33-percent total reduction in the clean water program over last year's budget. We cannot successfully manage this program without a transition. The 33-percent reduction will be devastating to the clean water program. I will elaborate very quickly on where that comes from. Twenty percent comes from the 106, which is a $10 million decrease from the Gramm-Rudman-Hollings decrease incorporated in that.

Section 205(g), which is the State management money for construction grants, is down by 25 percent; 205(j), which is water quality management, planning, water quality revisions, and nonpoint sources, has been eliminated under the President's budget; and our construction grants program has gone down 25 percent. Again, our position is we are in dire straits and will not be able to successfully manage this program.

We encourage you to continue it at $2.4 billion and to assist us and work with us in transitioning to a State revolving loan program. We support that; we are working very hard to do it. But it can't happen in a 4-year period.

As you were well aware, section 106 deals specifically with permitting enforcement, pretreatment monitoring and, to some degree, the ground water. EPA is asking us in their new fiscal year 1987 guidance to increase our activities to include under section 106 ground water, nonpoint source, toxins control, sludge, State revolving loan funds, and municipal enforcement, which is, of course, the July 1, 1988, deadline.

You are very familiar, I am sure, with that particular requirement, but what it says briefly is that local governments, with or without Federal funding, will meet secondary treatment level or their final permit limitations by July 1, 1988.

If they do not meet this requirement, they will be enforced against. What that does, in essence, is the small communities, of which in your State you have many who have been patiently waiting on the priority list for years, while the major communities have been taking the lion's share of the State appropriation, are now being told that their patience is in vain; they must meet their requirements and they are not getting construction grants dollars.

We do not think that that is an appropriate way to manage this program. We also find, in doing an analysis of our association, that the 33-percent reduction relates directly to reductions of States work forces. We are calculating a 30-percent reduction in personnel, which means that the implications are clear: We won't be able to do as much as we have been doing in the past.

In fact, we are being asked to do more with less and, in fact, now 33-percent less and, by our standards, that is absurd. We ask this committee to consider continuing the $2.4 billion appropriation.

We support the Governors Association's holding line at the 1986 funding level, and we would like to work with you and your staffers to do whatever we can to see that this program continues as effective as it has been over the last decade. Thank you.

[The statement follows:]

STATEMENT OF ROBERTA "ROBBI" SAVAGE, EXECUTIVE DIRECTOR, ASSOCIATION OF STATE AND INTERSTATE WATER POLLUTION CONTROL ADMINISTRATORS

Mr. Chairman, members of the Subcommittee. My name is Roberta, (Robbi) Savage, I am the Executive Director of the Association of State and Interstate Water Pollution Control Administrators. As you know, ASIWPCA is the professional organization of State managers of the Water Program. Our membership is comprised of the States, the Interstate Commissions and Territories. On behalf of the States Water Administration, let me extend to you our appreciation for allowing us this opportunity to discuss with you the Clean Water Program needs, relative to the Administrator's FY 87 Budget Proposal.

The 1972 Clean Water Act established a State/Federal Partnership to implement the National Clean Water Program. State Water Administrators embraced this concept and now manage over 75% of the program. This Subcommittee and the Congress, in turn, placed substantial trust in the States, investing billions of dollars in municipal wastewater treatment construction grants and millions of dollars in State Management assistance grants. That trust is justified, significant results have been demonstrated. Your support of this vital program is needed now, as in no time in the past. We urge you to continue clean water program funding at the FY 1986 level.

The Association has testified before this Subcommittee many times on the continuing need for the partnership. Since the Subcommittee is familar with the issues and has followed the transfer of program management to the States, ASIWPCA sees no need to reiterate well understood positions. We would, however, like to emphasize several points:

- The delegation established in the law is working and -- although it is often easy for those on the shores of the Potomac to put aside, the fact remains that the States do the lion's share of the :

  .. overall program management,
  .. water quality standards setting,
  .. permit issuance,
  .. enforcement, and
  .. water quality monitoring,

- To promote effective program management, States prefer to spend their limited resources on environmental cleanup, not paper shuffling.

- The State/Federal partnership cannot continue to effectively function with a -33% reduction in State Management Assistance as proposed by President Reagan. States cannot, with an abrupt -25% reduction in Construction Grants, transition effectively to revolving loan programs, or any other means of providing adequate funding for POTW's.

THE IMPACT OF PRESIDENT'S FY87 BUDGET ON STATE ENVIRONMENTAL PROGRAMS

($ Millions)

State Management Grants	FY86 Appropriation	FY86 After Gramm/Rudman 4.3% Cut	FY87 President's Budget (Total Change from FY 86 Appropriation)	FY87 Proposed as % Reduction From FY 86 Appropriation
I. WATER QUALITY:				
Section 106	$ 64.9	$ 62.1	$ 52.1 (-$12.8)	-20%
205 (g) Management	96.0	91.9	72.0 (-$24)	-25%
205 (j) Management	24.0	22.9	-0- (-$24)	-100%
Categorical Subtotal:	$184.9	$176.9	$124.1 (-$60.8)	-33%
II. REMAINING:				
AIR	95.0	90.9	95.0 (0)	---
DRINKING WATER	38.6	36.9	37.0 (-$1.6)	- 4%
HAZARDOUS WASTE	65.0	62.2	73.0 (+$8)	+12%
OTHER	11.5	11.1	-0- (-$11.5)	-100%
Categorical Subtotal:	$210.1	$200.8	$205.0 (-$5.1)	- 2%
GRAND TOTAL:	$395.0	$377.7	$329.1 (-65.9)	-17%
CONSTRUCTION GRANTS	$2400	$2296.8*	$1800*	-25%

* To be proposed only upon enactment of Clean Water Act reforms "acceptable" to the Administration. If the Act is not reauthorized, funding for FY 86 will be $600 Million and zero for FY 87.

FISCAL YEAR 1987
IMPACT OF THE PRESIDENT'S BUDGET ON STATE WATER QUALITY MANAGEMENT

SUMMARY IMPACTS

The Federal government relies on the States to manage and implement the nationally mandated Clean Water Act requirements using funding incentives under Sections 106 and 205(g) & (j) of the Act. The President's FY 87 Budget proposes a 33% cut in Federal support to State management assistance from FY 85 levels, and an abrupt -25% reduction in Construction Grants. This would significantly reduce the States' ability to protect and enhance surface and groundwater quality. In addition, the transition to State Revolving Loan Programs as articulated in the Clean Water Act Conference Committee Bill, would be seriously jeopardized.

Federal support to State programs is important for several reasons: 1) the Clean Water Act established a partnership between States and the Federal government to administer the national water program, and 2) the Federal funds provided under the Act leverage vast amounts of State funding for management and construction.

It is important to note that States established the base environmental program with water funds which continues to be the cornerstone of laboratory services, data management, administration, etc. A disproportionate cut in the water program would have negative consequences for not only water, but also other media programs, e.g. waste management, superfund, air, and pesticides. It is also important to stress the fact that State Water Quality programs are nearly twice as efficient as water quality programs administered by US EPA.

BUDGET IMPACTS

Over the past five years, States have instituted many economies to manage for environmental results. There is no "fat" left in the water programs. The cuts required under the President's FY 87 budget translate directly into reduced levels of environmental protection, as well as widespread non compliance with the Clean Water Act deadline of July 1, 1988 for municipal compliance with secondary treatment. Nondiscretionary duties such as permit issuance would take precedence over other activities:

* Existing requirements:
  .. Permitting,
  .. Enforcement,
  .. Pretreatment,
  .. Monitoring/Inspection

* New initiatives, all of which are priorities in the National Water Program for Fiscal Year 1987, would be particularly hard hit, for example:
  .. Groundwater protection,
  .. Nonpoint Source control
  .. Toxics control,
  .. Sludge Management
  .. establishing State revolving loan programs, and
  .. the US EPA National Municipal Policy to comply with the July 1, 1988 deadline.

Regulation of municipal and industrial discharges under the NPDES program is the largest component of most State water programs. Based on a recent survey of the States conducted by our Association, the cuts proposed by President Reagan will have the following major impacts on State activities:

PERMITTING	Under State and Federal law all municipal and industrial sources must have NPDES permits based on technology as well as water quality needs. The proposed budget cuts would:
Permit Backlog	Significantly delay permitting and increase the backlog of expired permits.
Toxicity Control	Seriously curtail expansion of State programs to address toxicity.
Delegation	Jeopardize (and in some instances terminate) State management of the NPDES program. With 37 States currently delegated the NPDES Program, US EPA would not be in a position to assume responsibility for these activities.
ENFORCEMENT	NPDES enforcement could be greatly impacted because of EPA's currently high priority on permit issuance and elimination of the existing backlog.
Surveillance	Surveillance and inspection of municipal and industrial facilities for compliance with Clean Water Act requirements would decrease with less violations being detected.
Enforcement Actions	Enforcement actions may well decrease with State response to facility non-compliance delayed.
MONITORING	Chemical and biological monitoring for conventional and toxic pollutants is essential to resolve priority water problems. The proposed budget cuts would limit: * identification of toxicity and other environmental problems, * documentation of trends and * evaluation of program effectiveness.
PLANNING	Establishment of environmental programs and control requirements would be severely curtailed, particularly with the President's proposal to eliminate §205 (j) funding.
Standards	Review and revision of State water quality standards would be delayed. Water quality based decisions would be increasing difficult to make and scientifically justify.
Programs	Development of water quality programs would be substantially delayed and in some cases terminated (e.g. State revolving loan and nonpoint source programs).
CONSTRUCTION GRANTS	The Federal construction grants program is for the most part, managed by the States. This system of delegation has worked well over the years and should be continued.
Delegation	State reserves of §205(g) funds needed to manage the planning decisions of construction of a municipal wastewater treatment facility are being significantly

eroded by delays in funding and project budget cuts. Delegated functions, in some circumstances, will out of necessity be returned to US EPA. Again, with 48 States currently delegated the Federal program the US EPA would find it difficult if not impossible to assume responsibility for these activities, since the Agency's own Water Program Office is reduced under the President's budget.

Project Management

With reduced resources, States would be unable to fully manage Construction Grant projects causing delays and reduced oversight, resulting in lower quality and eventually higher cost projects to the Federal government.

Construction

According to a recent ASIWPCA survey:

- More than 3330 projects necessary to meet the July 1, 1988 municipal enforcement deadline, have not to date been funded,
- The total estimated cost for these 3330 projects exceeds $20 Billion, ($11 Billion in Clean Water Act funding at a 55% Federal share).
- The President's FY 87 budget of $1.8 billion for municipal construction leaves a shortfall in Federal funding of more than $9 billion.*

NOTE: The President's budget limits funding to projects currently under construction (phased/segmented). It does not allow for funding new projects -- i.e. those generally in need of financial assistance to achieve the municipal compliance deadline of July 1, 1988.

GROUNDWATER

Federal incentives under §106 of the Act have accelerated State groundwater program development and implementation. The proposed FY87 budget would drastically decrease the momentum of this vital program at the very time when expansion is called for. Activities most affected include:

.. identification of groundwater contamination
.. source permitting,
.. sludge disposal, and
.. technical assistance to local governments.

* This figure relates only to project needs associated with the July 1, 1988 Municipal Enforcement deadline for secondary treatment levels.

Because of the President's unwillingness to request FY 1987 Construction Grants funding until "acceptable" reauthorization is achieved, the overall impacts will become **even more pronounced** if the:

1) Clean Water Act is not reauthorized in FY86, and/or
2) President's proposal to limit Construction Grants funds to phased/segmented projects is accepted by Congress.

SECTION 106 STATE MANAGEMENT ASSISTANCE ALLOCATION OF THE $12.8 PRESIDENT'S FY 87 BUDGET REDUCTION AMONG STATE WATER PROGRAM ACTIVITIES*

Enforcement	- 38%
Monitoring	- 16%
Permitting	- 18%
Planning	- 9%
Groundwater	- 8%
Administration	- 11%
Total:	100%

*Note: For each $100 of reductions required, States will take $38 from enforcement, $18 from permit issuance, etc.

TOTAL FY 87 REDUCTION FROM THE FY 86 BASE** BASED ON ASIWPCA SURVEY

Permits	- $4,256,000
Enforcement	- $8,512,000
Monitoring	- $3,648,000
Planning	- $7,904,000
Groundwater	- $2,432,000
Administration	- $1,824,000
Subtotal:	- $28,576,000
Management of the Federal Construction Grants Program	- $32,224,000
TOTAL	- $60,800,000

** In Sections 106, 205(g), and 205(j) funding.

STATE PERSONNEL REDUCTIONS

With the 33% State funding reductions as proposed by President Reagan, States according to the ASIWPCA Survey will reduce their Clean Water Program personnel by -30%.

WORKYEAR REDUCTIONS

Section	FY85 Program Level	FY87 Reduction
106 State Management Assistance	1670	240 (-14%)
205(g) 4% reserve of Construction funds to manage the Federal grant program	1600	470 (-29%)
205(j) 1% reserve of Construction Grant funds for water planning	390	390 (-100%)
TOTAL	3660	1100 (-30%)

It is critically important to emphasize that current program funding levels are essential to an effective Clean Water Program. This has been illustrated in a recent survey by the Chemical Manufacturers Association, which documents that 85% of the hazardous waste emitted into the environment is regulated under the Clean Water Act, through the NPDES process. States simply cannot continue their vigilance against toxic pollutants with a 33% decrease in the existing programs budget.

The Association of State and Interstate Water Pollution Control Administrators appreciates the opportunity to come before this Subcommittee and is prepared to answer any questions you may have.

MUNICIPAL PROJECTS CURRENTLY UNFUNDED BUT REQUIRED TO COMPLY WITH THE CLEAN WATER ACT JULY 1, 1988 DEADLINE

	Number of Community Projects	Total Project Costs
Number of States Reporting: 49		
Alabama	57	$181,332,000
Alaska	5	$ 50,460,000
Arizona	23	$138,255,000
Arkansas	82	$243,822,000
California	45	$925,879,000
Colorado	5	21,500,000
Connecticut	10	$123,700,000
Delaware	3	
Florida	86	not available
Georgia	49	$191,810,000
Hawaii	6	$187,730,000
Idaho	37	$ 20,816,000
Illinois	207	$984,555,000
Indiana	88	$378,410,000
Iowa	130	not available
Kansas	25	$ 54,936,000
Kentucky	27	$ 33,127,000
Louisiana	51	not available
Maine	30	$ 90,001,000
Maryland	42	$366,000,000
Massachusetts	50	$625,000,000
Michigan	149	$1,206,337,000
Minnesota	138	$225,707,000
Mississippi	86	$ 94,980,000
Missouri	68	$344,000,000
Montana	21	12,000,000
Nebraska	47	$ 42,807,000
Nevada	6	$ 42,850,000
New Hampshire	32	$360,500,000
New Jersey	315	$3,159,639,000
New Mexico	12	$120,500,000
New York	63	$1,825,990,000
North Carolina	27	$ 17,080,000
North Dakota		
Ohio	324	$1,227,632,000
Oklahoma	136	$282,175,000
Oregon	29	$ 33,614,000
Pennsylvania	160	not available
Rhode Island	5	$ 92,000,000
South Carolina	31	$165,800,000
South Dakota	not available	$ 61,100,000
Tennessee	85	$200,838,000
Texas	349	not available
Utah	23	$ 98,852,000
Vermont	23	$ 54,440,000
Virginia	65	$216,563,000
Washington	54	$1,805,000,000
West Virginia	not available	$2,590,800,000
Wisconsin	5	$960,640,000
Wyoming	22	$ 38,850,000
TOTAL	3338	$19,918,027,000
At a 55% Federal Share:		$10,954,915,000

March 28, 1986

TITLE II CONSTRUCTION GRANTS FUNDING STATUS -- STATE PROJECTIONS

	FY85/86 FUNDS AVAILABLE FOR OBLIGATION	FY85/86 FUNDS AVAILABLE FOR CONSTRUCTION	FY85/86 FUNDS SETASIDE*	AVAILABLE FOR CONSTRUCTION 4/30/86	5/30/86	6/30/86	PROJECTED DEPLETION**
Alabama	7.5	0.0	7.5	0.0	0.0	0.0	----
Alaska	10.8	7.9	2.9	2.4	0.0	0.0	----
Arizona	8.0	7.1	0.9	7.1	5.1	3.1	9/1/86
Arkansas	7.9	6.2	1.7	2.7	2.7	2.7	9/86
California	57.0	41.7	15.3	0.0	0.0	0.0	----
Colorado	4.3	4.3	0.0	3.3	2.8	2.8	9/30/86
Connecticut	13.3	10.0	3.3	0.0	0.0	0.0	----
Delaware	5.5	5.5	0.0	5.5	4.8	4.8	FY87
Florida	63.0	63.0	0.0	48.0	40.0	20.0	8/30/86
Georgia	10.0	9.6	0.4	0.0	0.0	0.0	----
Hawaii	16.0	16.0	0.0	16.0	16.0	16.0	9/30/86
Idaho	6.3	5.1	1.2	2.7	2.7	2.2	9/30/86
Illinois	50.7	50.7	0.0	0.0	0.0	0.0	----
Indiana	46.9	40.8	6.1	40.8	40.8	40.8	9/30/86
Iowa	16.3	11.7	4.6	8.4	5.1	2.9	7/30/86
Kansas	8.2	1.9	6.3	1.9	1.9	1.9	8/86
Kentucky	5.7	2.0	3.7	0.8	0.5	0.0	----
Louisiana	12.9	7.5	5.4	1.2	1.2	0.0	----
Maine	7.3	7.0	0.3	1.5	1.5	1.5	UNKN
Maryland	94.0	50.0	44.0	50.0	50.0	50.0	8/1/86
Massachusetts	33.8	31.6	2.2	27.0	20.0	5.0	9/86
Michigan	25.0	21.8	3.2	21.8	21.8	21.8	9/30/86
Minnesota	10.2	8.5	1.7	5.5	2.0	0.0	----
Mississippi	10.0	9.3	0.7	9.3	9.3	9.3	9/15/86
Missouri	18.3	16.0	2.3	2.0	1.0	0.0	----
Montana	1.3	1.2	0.1	0.8	0.4	0.0	----
Nebraska	2.7	1.3	1.4	1.3	1.3	1.1	9/1/86
Nevada	0.7	0.0	0.7	0.0	0.0	0.0	----
New Hampshire	9.0	7.9	1.1	1.1	1.1	1.1	8/30/86
New Jersey	56.2	35	21.2	35.0	30.0	30.0	9/86
New Mexico	1.5	1.0	0.5	1.0	1.0	1.0	9/86
New York	106.2	78.2	36.0	56.0	50.0	19.3	9/86
North Carolina	20.5	8.5	12.0	4.1	4.1	1.4	7/86
North Dakota	4.7	3.1	1.6	2.5	2.5	2.0	9/86
Oklahoma	10.4	8.6	1.8	6.2	3.8	1.6	8/30/86
Ohio	33.0	25.5	7.5	14.5	3.5	2.4	8/15/86
Oregon	22.5	18.0	4.5	8.0	4.0	0.0	----
Pennsylvania	29.4	19.4	10.0	3.5	3.5	0.0	----
Rhode Island	4.4	4.0	0.4	4.0	4.0	2.2	9/86
South Carolina	2.0	2.0	0.0	0.0	0.0	0.0	----
South Dakota	0.3	0.0	0.3	0.0	0.0	0.0	----
Tennessee	23.0	19.0	4.0	8.9	4.0	0.1	UNKN
Texas	18.6	13.8	4.8	6.4	4.0	0.0	----
Utah	3.1	2.5	0.6	0.0	0.0	0.0	----
Vermont	5.6	4.7	0.9	2.2	2.0	0.0	----
Virginia	22.0	20.0	2.0	16.0	14.0	12.0	9/30/86
Washington	25.6	15.2	10.4	15.2	15.2	0.0	----
West Virginia	7.0	7.0	0.0	0.0	0.0	0.0	----
Wisconsin	16.6	12.7	3.9	0.0	0.0	0.0	----
Wyoming	12.4	5.6	6.8	0.0	0.0	0.0	----
TOTAL	987.60	741.40	246.20	444.60	377.60	259.00	

Number of States Reporting: 50

Total States virtually out of funds (less than $2 Million unobligated) — end of:

April -- 20
May -- 22
June -- 31

* Not available for general obligation to communities for construction because the funds are setaside under Sections 205(g) and (j), rural community or innovative/alternative technology provisions, court orders, etc.

** NOTE: These projections by the States assume only a $600 Million FY86 appropriation. States indicating an unobligated balance may be holding these funds for their top priority project(s) which is not quite ready (e.g., it may be in the final stages of US EPA Advanced Treatment Review) or reserving the funds for grant increases. Therefore, States with unobligated balances could readily use additional appropriated funds for other projects on their priority list, should such funds be made available (SEE ATTACHMENT FOR SUCH ADDITIONAL PROJECTS LISTED BY STATE).

Senator ABDNOR. Thank you, Ms. Savage, and thank all of you for your very fine testimony. Obviously, you all know the problem, and what we have got to do is find some dollars. As I said, what comes out of that final budget resolution will have a lot of determination on what happens down here, because we can't even start putting money out until we know what the resolution is and how it breaks down.

We are going to have some real challenges, I can assure you. But we have a great chairman here, Chairman Garn. I am sure the committee will give this serious consideration, along with all the other challenges they face. You did a fine, fine job of presenting your case today. I am sure the States are pleased with your testimony. Your entire statements have been made a part of the record, and we thank you very much.

Ms. SAVAGE. Thank you very much.

Mr. HAAG. Thank you.

Mr. NIKKILA. Thank you, Mr. Chairman.

SUBCOMMITTEE RECESS

Senator ABDNOR. The subcommittee will stand in recess until Wednesday April 30, at 10 a.m. in room SD–125, where it will hear testimony from public witnesses on the various 18 agencies on the fiscal year 1987 budget under the jurisdiction of the subcommittee.

[Whereupon, at 4:46 p.m. Tuesday, April 29, the subcommittee was recessed to reconvene at 10 a.m. Wednesday, April 30.]

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT-INDEPENDENT AGENCIES APPROPRIATIONS FOR FISCAL YEAR 1987

WEDNESDAY, APRIL 30, 1986

U.S. SENATE,
SUBCOMMITTEE OF THE COMMITTEE ON APPROPRIATIONS,
Washington, DC.

The subcommittee met at 10:03 a.m. in room SD–124, Dirksen Senate Office Building, Hon. Jake Garn (chairman) presiding.

Present: Senators Garn, D'Amato, Stennis, Proxmire, and Johnston.

NONDEPARTMENTAL WITNESSES

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

STATEMENT OF MARTIN ISRAEL, PROFESSOR OF PHYSICS, WASHINGTON UNIVERSITY (ST. LOUIS), AND PAST CHAIRMAN, SPACE SCIENCE WORKING GROUP

HEARING PROCEDURE

Senator GARN. The subcommittee will come to order.

We are proceeding with the second day of public witness testimony. This year, we began hearing testimony from 19 different agencies and commissions under the jurisdiction of this subcommittee on February 18. We plan to conduct future agency hearings prior to our deliberative process.

Between now and this afternoon, we will hear from over 30 individuals and organizations who are taking their time to share their thoughts on how programs under this subcommittee's jurisdiction might be improved. We certainly hope that we can increase the program benefits while curtailing program costs.

These hearings have been particularly valuable to us in the past, and I am looking forward to the insights from the witnesses that will be provided today.

In order that we might follow the schedule, which is tight, with over 60 witnesses in 2 days, I will ask each witness to confine their testimony to the 5 minutes, and their entire statements will be placed in the record.

NASA SPACE SCIENCE PROGRAM

This morning, our first witness is Mr. Martin Israel, professor of physics at Washington University in St. Louis.

Mr. ISRAEL. Thank you, Mr. Chairman, for the opportunity to come here and testify on the NASA space science program. I represent the Space Science Working Group of the Association of American Universities, which is a consortium of 23 universities that are actively involved in space research. I would just like to speak from the testimony that was prepared here, but I won't say the whole thing in 5 minutes.

The university scientific community provides the backbone for space science research in the United States. It is the source of new talent, through the training of graduate students and postdoctoral researchers. It is a major source of the fundamental scientific questions and new scientific instrument development. It provides the analysis and interpretation of many mission results.

The university space science community, however, is a fragile enterprise, and unless we take deliberate, well-considered actions to protect the space science community in these times of shuttle reprogramming and budgetary reductions, it could be irreparably damaged.

I would like to ask, as your committee considers the NASA appropriation in fiscal year 1987, that you pay particular attention to the aspects of the scientific effort which can proceed during this unfortunate hiatus in launch opportunities. There are three areas in the budget where things can proceed and keep the viability up: the research and analysis line, the data analysis line, and the suborbital program.

Research and analysis is a place that funds some real scientific results that can be done in the laboratory. It is a place where you educate graduate students. It is a place where you can keep the scientific community active and supported over these times of difficult lack of flight opportunities.

SUBORBITAL PROGRAM

It goes hand in hand with the suborbital program. The continuing problem for the space science has been the lack of low cost flight opportunities, a problem that, of course, is now exacerbated due to the loss of *Challenger.* Low-cost flight opportunities are essential for development of new instrumentation, for the training of graduate students, and we ask that special care be taken in protecting the funding for the suborbital program, the balloons, the rockets, and the aircraft at this time.

Another area where the continuing analysis of data from on-going missions and past missions provides a particularly cost effective means to advance science. Again, in a time of no flight opportunities, it is a place where you can provide educational opportunities for graduate students and put university research capabilities to productive use. That, too, is an area of relatively low cost section of the NASA budget that we ask be protected if at all possible in these times.

To look beyond the immediate preserving of the capability during this hiatus in launches, there will be a shuttle program, the nation is resolved to not let the space program stop as a result of the *Challenger* loss. There will be a shuttle program and there will be a space science program, and we, on the Space Science Working Group, are very pleased to see the fiscal year 1987 budget containing a new start for the ocean topography experiment and funding for instruments as part of the international solar-terrestrial program.

There was no new start, as you well know, in fiscal year 1986 for space science, and it is important that we be working now on the space science programs that will be flying in the 1990's, and to do that there needs to be a continual, orderly progression of new starts for space science. So we are glad to see those in the budget, and we hope that they will be maintained.

I guess I would like to say briefly about our concern of the potential of a mandated Gramm-Rudman-Hollings across-the-board cuts in fiscal year 1987, should that come to be. If one talks about a 10-percent below the already post-Gramm-Rudman-Hollings cuts for fiscal year 1986, you are talking about inflicting a very serious blow to space science and applications in this country.

It, of course, would be ironic and sad to have Congress's near-term actions, which are designed to repair the Nation's economy by cutting budgets, is those cuts were to badly damage the infrastructure of scientific research, because in the long run, the Nation's economic health must depend on a sound and healthy scientific program.

So we ask that the fiscal year 1987 budget be designed to protect the essential elements of the space science program against the consequences of reprogramming budgetary reductions, to protect the university space science community so that it can continue to be an underpinning for space science research in the future. It must advance space science with a new start for the ocean topography experiment, and the experiments on the international solar-terrestrial program.

We clearly don't want to compound the shuttle tragedy by letting this time have irreparable harm to the Nation's space science effort.

Thank you for the opportunity to testify before you this morning, and I would be pleased to answer any questions.

NO REQUEST FROM ADMINISTRATION

Senator GARN. Thank you very much. I appreciate your testimony, and I understand your concern. We are in a difficult position at this time because all we have before the committee is the pre-*Challenger* request from the administration. I have deliberately not completed the hearings on NASA, not just because of the accident, but because of the situation with Mr. Beggs leaving and, hopefully, we will have a new Administrator of NASA today.

The Commerce Committee is supposed to be meeting in a markup on Dr. Fletcher. Not having a full Administrator there has caused difficulties and we have not had any revised budget request from the administration, which frankly I have been critical of, particularly in relationship to the replacement of *Challenger*. I think that it has taken them entirely too long. They have lost a lot of momentum, and I frankly cannot understand why it has taken more than 3 months to come up with a decision on where we are going in general in space.

I can't give you any assurances at this point because until we have an opportunity to have a recommendation from the administration, and then consider the implications of the cost of *Challenger*, and looking at a revised 1987 budget, rather than the one that was presented to us prior to the accident, it is difficult to make any decisions or conclusions at all.

We thank you very much for your testimony.

Mr. ISRAEL. Thank you.

[The statement follows:]

STATEMENT OF DR. LENNARD A. FISK, JR., PROFESSOR OF PHYSICS, UNIVERSITY OF NEW HAMPSHIRE, AND CHAIRMAN, SPACE SCIENCE WORKING GROUP, ASSOCIATION OF AMERICAN UNIVERSITIES

Mr. Chairman and Members of the Committee:

These are, of course, difficult times for our nation's space program: the tragic loss of Challenger and its crew; the public investigation into the cause of the tragedy; the uncertainty as to when we will launch satellites again; and the threat of massive budget cuts under the Gramm-Rudman-Hollings bill.

Throughout these difficult times, however, we should never lose sight of the fact that the nation's future depends on space. We are a space-faring nation, destined to explore. Our long-term economic health and national security depends on our understanding space. As human beings we need to understand our place in the universe.

I represent the Space Science Working Group of the Association of American Universities, which is a consortium of 23 universities that are actively involved in space research. I would like, today, to comment on the proposed FY 1987 space science budget but cannot do that without also sharing with you the concerns we have about the consequences of the Shuttle tragedy and of Gramm-Rudman-Hollings budget reductions. (A more detailed analysis of the original proposed budget is appended to this statement.) I will also argue that--if it is expected to continue to play its vital role in the nation's space program--the university space science effort must be given priority in the near-term and long-term program and budget planning at NASA.

The university scientific community provides the backbone for space science research in the United States. It is the source of new talent, through the training of graduate students and postdoctoral researchers. It is a major source of the fundamental scientific questions and new scientific instrument development. It provides the analysis and interpretation of mission results. Indeed, one of the basic tenets for why the United States conducts the space program is for the scientific breakthroughs NASA makes--to which the university scientific community is an essential participant.

The university space science community, however, is a fragile enterprise. The number of viable groups that have survived through the recent years of budgets, that have either barely or not kept up with inflation, is minimal. We must insure that there is a continuity of funding to these groups so that they are not dissolved, never to be reassembled.

Unless we take deliberate, well-considered actions to protect the university space science community in these times of Shuttle reprograming and budgetary reductions, it will be irreparably damaged.

The Challenger accident was not only a personal tragedy to the nation, but it will also have profound implications for the conduct of space science in the United States for many years to come. Since the development of Shuttle, we have been dependent on it for the launching of major missions. The flight program is thus at a complete stop until the Shuttle flies again, or until alternative launch vehicles are provided.

Even when Shuttle flies again, we will have only a three-orbiter fleet to service the heavy demands of the military, commercial users, and the scientific community. The Ulysses and Galileo missions will not fly this May, and unless another Shuttle is equipped, as was Challenger, to accommodate the Centaur rocket, it will be possible to launch only one of these missions in the next Jupiter launch window in June 1987. The launch of Space Telescope and numerous Spacelab flights may be delayed as well.

These disruptions will have a major impact on the budget of the Office of Space Science and Applications. Delays in flight programs inevitably mean cost overruns. Contract and center personnel cannot be released from a project until the mission is launched.

Delays in flight programs also place an unusual burden on the already strained Research and Analysis budgets of the Office of Space Science and Applications--which provide the basic support for all university space science research. Research and Analysis funds provide for instrument development, theoretical, laboratory, and observational studies, and for graduate education. With the delay in flight programs, Research and Analysis funding takes on a new significance. University groups that had anticipated support from flight programs, can now only sustain their essential capabilities with Research and Analysis funding.

We would ask, as you develop authorization legislation for the FY 1987 NASA budget, that you consider the following principles:

Do not put the space science program in double jeopardy. The Office of Space Science and Applications will already bear considerable costs for delays in Shuttle flights. Do not also require that it contribute to the cost of replacing the fourth orbiter, or to the development of alternative launch capabilities.

We ask also that you give some priority to the Research and Analysis budgets that maintain the capabilities of the university space science community, and indeed, if possible, enhance these funds to provide alternative funding to that which was expected from flight missions.

The proposed FY 1987 budgets for Research and Analysis would provide funding essentially at the FY 1986 level--that is, the level prior to Gramm-Rudman-Holling cuts. At the very least, in any reprograming or amending of the budget, the Research and Analysis budget should not be allowed to fall below the proposed FY 1987 level.

A continuing problem for U.S. space science has been the lack of low-cost flight opportunities--a problem now exacerbated by the loss of Challenger. Low-cost flight opportunities are essential for the development of new instrumentation and for the training of graduate students. Special care must be taken to protect the funding of the suborbital program--balloons, rockets, and aircraft.

We note that the FY 1986 revised operating plan reveals that modifications planned for the Galileo II replacement aircraft will be deferred and planned sounding rocket activities will be reduced. At a time when major flight programs are not available to the science community, we think that these planned reductions are unfortunate.

In addition, NASA should provide support for U.S. participation in flights of opportunity, both domestic and foreign. The training of the next generation of space scientists cannot cease, while the Shuttle problems are rectified.

The continuing analysis of data from ongoing missions is a particularly cost-effective means to advance science. Indeed, in this time of no flight opportunities, it is another means to provide educational opportunities for graduate students, and to put university research capabilities to productive use. Proposed funding for Mission Operations and Data Analysis, in some cases, has been significantly increased to accommodate missions that were to have been launched this year, but are now delayed. Whenever possible, these funds should be directed to support university research.

The nation's grief over the loss of the Challenger crew was accompanied by an overwhelming resolve to continue and to move forward with the space program. There will be a Shuttle program and eventually a Space Station. Similarly, there will be a vigorous space science program.

The President's proposed FY 1987 budget contains a new start for the Ocean Topography Experiment (TOPEX) and funding for instruments to be flown as part of the International Solar Terrestrial Program. We are particularly pleased to see these in the budget as there was no new start proposed for FY 1986. These missions will provide for the orderly advance of U.S. space science and are essential to the continuity of the program. Nothing should be allowed to interfere with their successful execution.

These are not only times of Shuttle problems, but also of potential, massive budgetary reductions. In the current fiscal year, the Gramm-Rudman-Hollings reduction to the Office of Space Science and Applications is 4.6%, or $72 million. Coming as it does in the second half of the fiscal year, this reduction will result in unanticipated cancellations of grants, and will cause serious damage to the orderly execution of university research.

We are dismayed to note that NASA's FY 1986 revised operating plan reveals that the OSSA Research & Analysis (R&A) budgets have been reduced by amounts in the range of 4.8 to 5.4%. According to the NASA document, these reductions do not involve the impact of the Challenger accident. We think it unfortunate that these accounts which have been funded at modest levels for the past several years must bear a disproportionate amount of the legislatively mandated, across the board 4.3% reduction.

The potential of mandated across-the-board cuts in FY 1987 is estimated at approximately 8% to 10% below the post Gramm-Rudman-Hollings level for FY 1986. If a reduction of this magnitude is inflicted on the Office of Space Science and Applications, the nation may cease to have a viable space science program. It is ironic and sad that an outcome of the Congress' near term actions to repair the nation's economy by cutting budgets is disabling the scientific infrastructure that is so crucial to the nation's long term economic health.

Surely, there must be a better way to reduce the federal deficit and we encourage the Congress and the President to find it.

The development of the NASA budget this year has unparalleled significance. The recent stunning successes of the European, Japanese and Soviet probes which photographed Comet

Halley and explored its surroundings provide a keen reminder of the high priority given to space research by the major industrial countries. The success of these probes, and the conspicious lack of a leading American participation in this adventure, were outcomes of decisions made years ago. Similarly, the decisions made this year and next will determine the shape of the U.S. space program in the 1990's, and will determine whether or not we maintain our leadership in space.

The budget must be designed to protect the essential elements of the space science program against the consequences of reprograming and budgetary reductions. It must protect the university space science community so that it can continue to provide the underpinning for space science research in the future. It must advance space science with a new start for the Ocean Topography Experiment (TOPEX), and with support for the International Solar Terrestrial Program (ISTP).

Let us not compound the Shuttle tragedy by allowing irreparable harm to be done to the nation's space science effort.

Thank you.

APPENDIX

NOTE: This analysis was completed on February 11, 1986 and is based on information available on that date. It may not address fully the impact of FY 1986 Gramm-Rudman reductions or programmatic and budgetary changes resulting from the Shuttle tragedy. The reader is referred to a separate statement by the Space Science Working Group on the Shuttle tragedy.

APPENDIX: ANALYSIS OF PROPOSED FY 1987 NASA SPACE SCIENCE BUDGET AND COMMENTS ON EFFECTS OF THE GRAMM-RUDMAN REDUCTIONS IN FY 1986

INTRODUCTION AND OVERVIEW

Following is an analysis of the FY 1987 NASA space science budget as submitted to the Congress in the President's budget message. This budget was prepared prior to the Challenger tragedy. At this writing, the full budgetary impact of that tragedy is unknown, so in this paper, the Space Science Working Group analyzes the FY 1987 budget as it was originally proposed. In addition, we have commented on effects of the Gramm-Rudman-Hollings budget cuts in FY 1986, although the full impact of these cuts is not known at this writing.

The proposed FY 1987 budget for the Office of Space Science and Applications preserves about the same level of activity in space science as there was in FY 1985. (See the budget table on pages A-7 and A-8.) The budget includes one major new start, the Ocean Topography Experiment (TOPEX) and instrument developmnet for the International Solar Terrestrial Program (ISTP). It preserves most other science programs that were underway, with the exception of the Solar Optical Telescope (SOT) which is proposed for cancellation. In general, Research and Analysis (R&A) budgets are approximately even with current levels.

It should be noted that this lean budget provides no flexibility to prepare for the types and levels of activities anticipated in the space station era. The development of research programs and scientific instruments to fly on space station will be needed in the near future in order to utilize the station's capabilities for space science.

If, as a result of the provisions of the Gramm-Rudman bill or other deficit reduction plan, there are major budgetary cutbacks in FY 1987, the nation's space science programs will suffer a severe and long-term setback.

PHYSICS & ASTRONOMY

The overall budget for Physics & Astronomy in FY 1987 is $539.4M, down by 11% compared with the initial FY 1986 operating plan and by 20% compared with FY 1985. This decrease is largely due to the fact that the two major flight programs in this division, the Hubble Space Telescope (HST) and the Gamma Ray Observatory (GRO), are well past the peaks of their funding curves, and Physics and Astronomy has seen no New Start authorization for a major flight program since GRO was approved in the FY 1981 budget.

Not only has Physics and Astronomy seen no new start in several years, but the FY 1987 budget proposes termination of funding for the Solar Optical Telescope (SOT), which, in previous years, had been an approved project as part of the Shuttle/Spacelab Payload line. This high-resolution optical telescope had been planned as the cornerstone of future studies of the Sun. It was expected to provide information concerning processes on the surface of the Sun which occur on size scales smaller than currently resolvable, and are thought to be vital to understanding the Sun and its terrestrial effects. Some way will have to be found to meet the scientific objectives of SOT.

The Shuttle Payload line does include funds for the Shuttle High Energy Astrophysics Lab (which had been planned for flight in early FY 1987), the Space Plasma Physics Lab (planned for the early 1990's) and several other missions.

The Explorer line, at $56.7M, shows an increase since FY 1985 which is approximately equal to inflation. This level will permit planned progress on the Cosmic Background Explorer (COBE); the U.S. experiments on the German X-ray astronomy satellite, ROSAT; the Heavy Nuclei Collector, a low-cost detector for ultraheavy cosmic rays scheduled for a reflight of the Long Duration Exposure Facility; development of the Extreme Ultraviolet Explorer (EUVE); and the Combined Release Radiation Effects Satellite (CRRES) and the San Marco-D joint mission with Italy to study the relationship between solar activity and meteorology.

The Mission Operations and Data Analysis (MO&DA) line shows a sharp increase in FY 1987 to $172.7M, up by $54.7M from the FY 1986 plan. This increase principally reflects the planned transfer of Hubble Space Telescope (HST) from the development to the operations phase. (The HST development line falls by $100M from FY 1986 to FY 1987.) HST efforts in the MO&DA line include actual telescope operations and data analysis as well as preparation for maintenance and refurbishment.

The Research and Analysis (R&A) line shows an 8% increase from FY 1985 to FY 1986 but is essentially unchanged in FY 1987 (a loss to inflation of several percent). The increase in FY 1986 was principally a reprograming of funds from other areas to begin the development of a Shuttle-borne engineering test of instrumentation for Gravity Probe-B (GP-B), which would later be developed as a free-flying satellite to test a fundamental hypothesis of the theory of General Relativity. This budget line also includes funding for Advanced Technology Development of the Advanced X-ray Astronomy Facility (AXAF) and the Space Infrared Telescope Facility (SIRTF). There is no effective increase from FY 1985 to FY 1987 in R&A funds for Supporting Research and Technology, the basic grant support for university-based space science groups.

The Suborbital Program shows approximately inflationary increases only from FY 1985 to FY 1987. This program supports sounding rockets, airborne science, and stratospheric balloons. In addition, $5.9M of this $64.4M line is scheduled for support of low-cost Shuttle payloads (Spartans) which replace some sounding rockets. One Spartan experiment and much of the common hardware which was planned to be used for future Spartans were destroyed in the Challenger accident.

NASA management in the division of astrophysics is considering the options for the Gramm-Rudman cuts, so the actual effects are not yet known. It appears that the cuts will not be apportioned uniformly across the division. For example, in Mission Operations and Data Analysis, some costs cannot be cut without severely impairing operations of existing satellites, or cannot be cut because they are already spent (e.g., SMM repair). As a result, other parts of that budget such as the grants to scientists who are analyzing data, are expected to bear more than the "standard" 4.8% cuts. Similarly, within the Research and Analysis line, it may prove necessary, to cut by substantially more than 4.8%, the budget used to fund Supporting Research and Technology, the principal source of basic research funds for university groups. It appears that some of the reserves in this division's original FY 1986 budget were used up when, as part of the FY 1986 operating plan $8M were transferred into R&A for GP-B. This makes the Gramm-Rudman cuts in FY 1986 particularly difficult to absorb.

LIFE SCIENCES

The Life Sciences Program is the key to developing a capability to sustain a pertinent manned presence in space and to utilize the space environment to study living systems. The requested budget for FY 1987 represents a modest continuation of the steady rise in funding experienced over the last three years. This request represents a 7% increase over FY 1986 which in turn was a 12% increase over FY 1985. The budget estimate represents less than 1% of the agency budget and approximately 5% of the OSSA budget.

The program is divided into flight experiments and Research and Analysis (R&A). The range of experimental interests in the program includes: 1) space medicine, 2) advanced life support systems, 3) gravitational biology, 4) exobiology, and 5) biospheric research. The flight experiments portion (49%), has grown 25% and 6% over the last two fiscal years. This growth reflects the active and expanding participation of the life sciences in shuttle and international flight activities. This budget supports dedicated spacelab life science flights (e.g., SLS-1, SLS-2, SLS-3), fractions of spacelab missions (e.g., SL-1, SL-3, EOM) and a program with smaller mission of opportunity experiments that can be flown in the orbiter middeck. Finally, life sciences is involved in several international efforts, including two recent Soviet Cosmos Biosatellite flights (D-1, SPACELAB-J, IML-1).

The Research and Analysis portion accounts for 51% of the budget which has grown at rates of 2% and 6% respectively from FY 1985 and FY 1986. This program funds ground-based and pre-flight research in basic biology and in those medical problem areas that affect manned spaceflight.

Currently, it is expected that the FY 1986 Gramm-Rudman reductions will be distributed evenly between the flight and research components of life sciences. At present, it appears that the combined influences of Gramm-Rudman, the earlier Congressionally mandated budget cut of $4M and flight hardware repairs, will constitute an approximate ten-plus percent reduction in the FY 1986 budget alone.

PLANETARY EXPLORATION

The FY 1987 budget proposal for the Planetary Exploration Program is a "level of effort" budget involving no new starts. It provides for the orderly continuation of the Galileo, Magellan, Ulysses, and Mars Observer missions. The Galileo and Ulysses development line items have been eliminated, reflecting the planned completion of the development phases of these missions. The Magellan (previously known as the Venus Radar Mapper) development line item decreases from $109.3M to $66.7M, reflecting the stage of development of the spacecraft. The Mars Observer (MGCO) budget increases from $37.8M to $62.9M, reflecting increased activity in spacecraft development, experiment development, and ground operations.

The Mission Operations and Data Analysis (MO&DA) line increases from $83M to $130.2M principally reflecting the progression of Galileo and Ulysses from development through launch to initial operations. The Research and Analysis line provides for the analysis of data from ongoing missions and for theoretical, laboratory, and observational studies in support of planetary exploration. The R&A line of $63.5M is 1% above the FY 1986 current estimate and, hence, constitutes a modest decline in terms of real purchasing power.

As a result of Gramm-Rudman cuts, the FY 1986 Planetary Exploration program will be reduced by $13M-$14M resulting in an approximate 5% reduction in available Research and Analysis support this year. The loss of the Challenger has serious consequences for this program because that shuttle was one of only two modified to accept the Centaur upper stage and, hence, capable of launching missions such as Galileo. It seems impossible to launch Galileo and Ulysses in the same launch window unless another shuttle is modified to accept the upper stage.

SOLID EARTH OBSERVATIONS

The proposed Solid Earth Observations Program budget for FY 1987 is at a level ($74.1M) about 1% less than in FY 1986 ($74.9M). The R&A lines in Geodynamics and Land Processes are either level with last year or show very modest increases.

The Crustal Dynamics Project, planned to measure the movement and deformation of the Earth's tectonic plates as well as variations in the rigid-body rotation of the Earth, is budgeted at $18.1M which is down 2% from last year and is about even with the 1985 level. With this reduction, there will likely be fewer baseline measurements made than in the current year and the pace and scope of the program will be correspondingly reduced. The parallel budget line for laser network operations is about at the FY 1986 level.

Several Shuttle experiments are planned, including reflights of the Shuttle Imaging Radar (SIR-B), the Large Format Camera and the first flight of a new multi-polarization, dual frequency radar imaging system (SIR-C). Technology development will continue for advanced spectrometer instruments for airborne and spaceborne use, including the Shuttle Imaging Spectrometer Experiment (SISEX). The FY 1987 budget line for these activities, at $21.6M, is down 6.5% from FY 1986.

ENVIRONMENTAL OBSERVATIONS

The proposed version of the NASA budget brings good news in the form of a "new start" for the Ocean Topography Experiment (TOPEX) mission. We are pleased to see the proposed allocation of funds for the development and construction of instruments for the International Solar Terrestrial Program (ISTP). Funding for the Upper Atmosphere Research Satellite (UARS) has been cut by roughly $10M both in 1986 and 1987. Thus, although a successful mission is still expected, funds for contingency and flexibility purposes have been lost.

Proposed Research and Analysis budgets do not keep up with cinflation in this division as in others. However, this leaves the research program in a lean and inflexible status. Although decreases in Mission Operations & Data Analysis were expected in 1988 and beyond, the proposed decreases for FY 1987 would come sooner than expected. Funding for extended mission operations show a 10% decrease from present year funding. Continued data analysis of ongoing missions, particularly the highly successful International Sun-Earth Explorer (ISEE) and Dynamics Explorer (DE), remain an extremely cost-effective way to do science.

SPACE SCIENCE IN THE FY 1987 NASA BUDGET
(in millions of dollars)

	1982	1983 a/	1984	1985	Pre-GRH Cuts b/ 1986	Proposed 1987
Total NASA	6020.0	6836.4	7217.5	7510.7	7587.2	7641.3
Total Research & Development	4772.0	1902.5	2028.5	2422.6	2756.8	3003.1
Space Flight, Control and Data Communications	-	3633.0	3775.3	3601.8	3397.9	3069.0
Total Space Science & Applications	896.2	1034.1	1157.0	1404.5	1548.5*	1464.0
Space Station	-	-	(21.9)	150.0	210.0	410.0
Total Physics & Astronomy	322.4	470.3	567.6	677.2	607.1	539.4
Space Telescope Development	121.5	182.5	195.6	195.0	127.8	27.9
Gamma Ray Observatory	8.0	34.5	85.9	117.2	87.3	51.5
Shuttle/Spacelab	47.6	81.0	80.9	105.4	108.3	115.1
Explorer Development	33.3	34.3	48.7	51.9	50.7	56.7
Mission Operations & Data Analysis	45.3	61.4	68.1	109.1	118.0	172.7
Research & Analysis	22.9	28.5	35.8	39.9	51.5	51.1
Suborbital	43.8	48.1	52.3	58.7	63.5	64.4
Total Planetary Exploration	210.0	186.4	217.4	290.9	352.8	323.3
Galileo	115.7	91.6	79.5	56.1	54.2	-
Venus Radar Mapper	-	-	29.0	92.5	109.3	66.7
International Solar Polar	5.0	6.0	6.0	9.0	5.6	-
Mars Geoscience/ Climatology Orbiter	-	-	-	13.0	37.8	62.9
Mission Operations & Data Analysis	42.6	38.5	43.4	58.8	83.0	130.2
Research & Analysis	46.7	50.3	59.5	61.5	62.9	63.5
Total Life Sciences	39.5	55.7	58.0	62.3	69.9	74.7
Flight Experiments	14.0	24.0	23.0	27.1	34.0	36.7
Research & Analysis	25.5	31.7	35.0	35.2	35.9	38.0
Total Solid Earth Observations	149.4	128.9	76.4	57.6	74.9	74.1
Laser Network Opns	81.9	58.4	16.8	8.0	8.5	8.6
Shuttle/Spacelab	12.3	14.5	17.0	12.1	23.1	21.6
Geodynamics	22.9	28.1	28.0	29.9	23.2	23.5
Research & Analysis	15.5	11.8	14.6	15.6	20.1	20.4

SPACE SCIENCE IN THE FY 1987 NASA BUDGET (continued)
(in millions of dollars)

	1982	1983	1984	1985	Pre-GRH Cuts 1986	Proposed 1987
Total Environmental Observations	133.0	156.9	162.0	212.7	289.8	367.9
Total Research & Analysis	71.8	86.4	90.8	95.6	101.7	115.1
Upper Atmosphere	20.5	27.7	28.4	31.0	33.0	33.4
Atmosphere dynamics and Radiation R&A	22.3	26.5	27.4	28.5	30.3	30.9
Ocean processes	16.9	17.0	18.2	19.4	20.6	20.8
Space Physics	12.1	15.2	16.8	16.7	17.8	18.0
Shuttle/Spacelab	4.1	3.7	7.6	7.8	5.6	12.0
Earth radiation budget	24.0	24.0	15.5	8.1	2.0	-
Extended mission ops	16.1	22.8	27.4	29.5	37.0	33.6
Interdisciplinary R&A	-	-	-	1.0	1.0	1.1
Tethered Satellite Payloads	-	-	-	3.0	4.5	1.0
Scatterometer	-	-	-	12.0	14.0	35.9
Upper Atmos Research Satel.	6.0	14.0	20.0	55.7	124.0	152.2
Ocean Topograph Exper.	-	-	-	-	-	29.0

a/ Shown on a comparative basis with the budget structure changes instituted in FY 1984.

b/ The FY 1986 total budget figure does not reflect $322.7M in reductions mandated under the Gramm-Rudman law.

* The OSSA total figure does not reflect $75.0M in reductions mandated under the Gramm-Rudman law.

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

STATEMENT OF R.J. GODIN, JR., PRESIDENT, NATIONAL LEASED HOUSING ASSOCIATION

ACCOMPANIED BY CHARLES L. EDSON, COUNSEL

Senator GARN. Next, we will hear from Mr. R. J. Godin, Jr., president of the National Leased Housing Association.

How badly did I mispronounce your name?

Mr. GODIN. You were pretty close, better than most.

I am Jack Godin, president of Southern Development Co. in Montgomery, AL, and the National Leased Housing Association, on whose behalf I am testifying today. I am accompanied by Charles L. Edson, counsel for the association.

The National Leased Housing Association represents over 750 member organizations involved in multifamily rental housing, public housing authorities, developers, managers, nonprofit financiers, and syndicators. All of our members share an overriding concern for the provision of affordable rental housing for low- and moderate-income American. It is this concern which brings us before you today.

REJECTION OF FUNDING DEFERRALS RECOMMENDED

Our primary purpose here is to urge this committee and the entire Senate to reject the funding deferrals contained in the administration's fiscal year 1987 assisted housing budget and to fund assisted housing in fiscal year 1987 at a current services level.

The administration's fiscal year 1987 budget proposal asks for a rescission of $4.8 billion of fiscal year 1986 housing funds along with a deferral of an additional $2.3 billion. The Congress has wisely chosen not to approve the assisted housing rescissions and we ask that the member of this committee support H.R. 4515, the fiscal year 1986 urgent supplemental appropriation bill, which contains language to overturn the funding deferral.

The House HUD-Independent Agencies Subcommittee, as I am sure you are well aware, has been very vocal in their rejection of the deferral and has inserted such language in H.R. 4515. The report language states that while the committee has no objection to the application of the 4.3-percent reduction applied to these areas owing to the impact of Gramm-Rudman, it does not believe that the deferral or rescission of budget authority constituting 70 percent of the 1986 appropriation for subsidized housing is either fair or equitable.

The report continues that this use of a deferral mechanism has distorted the 1986 budget in that it is being used to change the purpose and the character of the appropriations for assisted housing.

NLHA agrees wholeheartedly with this assessment. Since 1981, budget authority for assisted housing programs has been cut by 66 percent. Total cuts would have been increased to 80 percent had the administration's fiscal year 1987 budget plan been automatically adopted. While all programs have been subject to cuts to meet Gramm-Rudman spending levels, we cannot emphasize too strongly that assisted housing has already taken its fair share, and more, of budget reductions.

On the eve of the 50th anniversary of the U.S. Housing Act of 1937, we must remember our Nation's commitment to assist in the housing of low-income Americans. We urge you to support H.R. 4515 and its rejection of assisted housing fund deferrals.

The National Leased Housing Association supports funding in fiscal year 1987 at a current services level. We must take this opportunity to stress not only the importance of maintaining the dollar funding level, but also the programs targeted for funding.

CONTINUE FY 1986 FUNDING

We urge continued support for those programs funded in fiscal year 1986: the Section 202 Program for the Elderly and Handicapped, the Moderate Rehabilitation Program, public and Indian housing units, the Housing Development Grant Program, and the Section 8 Existing Housing Program.

The administration's proposal would transfer the entire Federal commitment to low-income housing to its own housing voucher concept, a program which is still by statute an experimental one. The Department of Housing and Urban Development has been asked for 2 years now to submit to the Congress a report on the demonstration voucher experience but has yet to do so. To continue to add incremental units to a program which has never been authorized is certainly a distortion of legislative authority.

The National Leased Housing Association has long been on record as opposing the conversion to a full voucher program. While the debate continues over the need for increasing the supply of rental housing stock in this country, NLHA continues to maintain the position that there is indeed a shortage of affordable rental housing for low- and moderate-income families. To meet this end NLHA endorses, as we have in the past, the continuation of the successful section 8 existing housing program. The section 8 existing program has proven to be the most cost-effective and efficient housing program in the history of Government-assisted housing.

SECTION 8 EXISTING PROGRAM

It must be recognized that in order for the section 8 existing program to continue its effective functioning that the administrative fee structure, so essential for program performance, cannot be tampered with.

This year, as part of its fiscal year 1987 budget, HUD proposes through regulatory rulemaking a further 14.38-percent reduction in administrative fees for the Section 8 Certificate Program. HUD is also preparing legislation that would drop one-half of the Federal Government's responsibility for administrative fee costs, providing State and local governments with the opportunity to pay for the administration of millions of section 8 certificates and vouchers.

These cuts will decimate PHA staff services, delete program reserves, and undermine the fiscal stability of hundreds of public housing authorities responsible for thousands of assisted units.

HUD is quick to charge that PHA's receive too much in administrative fees and quicker yet to pursue every means possible to cut these fees, regardless of the impact of these fee cuts on section 8 program administration. Last year, this committee instructed HUD to establish an appeals process by which individual PHA's could analyze the impact of the fiscal year 1986 10-percent fee cut and appeal for partial or full restoration.

In its fiscal year 1987 budget book, HUD dismisses the committee's concerns, announces further cuts, finally stating, "The appeals process contemplated by the Senate no longer is feasible and is not being implemented." This is just not right.

The section 8 existing program is the main delivery system of housing assistance for millions of low-income families. After years of effort at every level of government, from this committee down to the smallest public housing authority, this program is on line and working well.

HUD's arbitrary fee cutting actions, its refusal to establish an appeals and fee restoration process as instructed by Congress, and its attempt to legislatively shirk half of its fiscal responsibility for underwriting this program are unwarranted actions being taken to dismantle this essential program that houses millions of low-income Americans.

This committee must not permit HUD to undermine 15 years of successful local program development through fiscal and administrative sabotage at the Federal level. We respectfully request that you insist that HUD immediately establish a legitimate appeals procedure and we urge you to deny HUD's planned fiscal year 1987 fee cut for the section 8 existing certificate program. This is the only fair and legitimate course to protect our commitment to effective continuance of this vital housing assistance program.

Finally, as you are no doubt aware, today FHA authority expires, coupled with the fact that GNMA and FHA have also run out of authority has created an impossible situation. We would be remiss not to urge the Senate to join the House in increasing GNMA and FHA authority, and to extend from this date the FHA insuring capability.

PREPARED STATEMENT

Senator GARN. Thank you very much. We appreciate your coming. Your full statement will be printed in the record

Mr. GODIN. Thank you.

[The statement follows:]

STATEMENT OF R.J. GODIN, JR., PRESIDENT, NATIONAL LEASED HOUSING ASSOCIATION

My name is R.J. Godin, Jr. and I am President of the Southern Development Company in Montgomery, Alabama and the National Leased Housing Association on whose behalf I am testifying today.

The National Leased Housing Association represents more than 750 member organizations involved in multifamily rental housing - - public housing authorities, developers, managers, non-profits, financiers and syndicators. All of our members share an overriding concern for the provision of affordable rental housing for low and moderate income Americans. It is this concern which brings us before you today.

Our primary purpose here today is to urge this Committee and the entire Senate to reject the funding deferrals contained in the Administration's FY87 assisted housing budget and to fund assisted housing in FY87 at a current services level.

The Administration's FY87 budget proposal asks for a rescission of $4.8 billion of FY86 housing funds along with a deferral of an additional $2.3 billion. The Congress has wisely chosen not to approve the assisted housing rescissions and we ask that the members of this Committee support H.R. 4515, the FY86 Urgent Supplemental Appropriation bill, which contains language to overturn the funding deferral. The House HUD-Independent Agencies Subcommittee, as I am sure you are well aware, has been very vocal in their rejection of the deferral and has inserted such language in H.R. 4515. The report language states that "while the Committee has no objection to the application of the 4.3 percent reduction applied to these areas owing to the impact of Gramm-Rudman, it does not believe that the deferral or rescission of budget authority constituting 70 percent of the 1986 appropriation for subsidized housing is either fair or equitable." The report continues that "this use of a deferral mechanism has distorted the 1986 budget in that it is being used to change the purpose and the character of the appropriations for assisted housing."

NLHA agrees wholeheartedly with this assessment. Since 1981 budget authority for assisted housing programs has been cut by 66 percent. Total cuts would have been increased to 80 percent had the Administration's FY87 budget plan been automatically adopted. While all programs have been subject to cuts to meet Gramm-Rudman spending levels, we can not emphasize too strongly that assisted housing has already taken its fair share, and more, of budget reductions. On the eve of the 50th anniversary of the U.S. Housing Act of 1937 we must remember our nation's commitment to assist in the housing of low income Americans. We urge you to support H.R. 4515 and its rejection of assisted housing fund deferrals.

The National Leased Housing Association supports funding in FY87 at a current services level. We must take this opportunity to stress not only the importance of maintaining the dollar funding level, but also the programs targeted for funding. We urge continued support for those programs funded in FY86: the Section 202 program for the elderly and handicapped, the moderate rehabilitation program, public and Indian housing units, the housing development grant program, and the Section 8 existing housing program. The Administration's proposal would transfer the entire federal commitment to low income housing to its own housing voucher concept - a program which is still by statute an experimental one. The Department of Housing and Urban Development has been asked for two years now to submit to the Congress a report on the demonstration voucher experience but has yet to do so. To continue to add incremental units to a program which has never been authorized is certainly a distortion of legislative authority.

The National Leased Housing Association has long been on record as opposing the conversion to a full voucher program. While the debate continues over the need for increasing the supply of rental housing stock in this country, NLHA continues to maintain the position that there is indeed a shortage of affordable rental housing for low and moderate income families. To meet this end NLHA endorses, as we have in the past, the continuation of the successful Section 8 existing housing program. The Section 8 existing program has proven to be the most cost effective and efficient housing program in the history of government assisted housing.

Administrative Fees

It must be recognized that in order for the Section 8 existing program to continue its effective functioning that the administrative fee structure, so essential for program performance, cannot be tampered with.

This year, as part of its FY87 budget, HUD proposes through regulatory rulemaking a further 14.38 percent reduction in administrative fees for the Section 8 certificate program. HUD is also preparing legislation that would drop one-half of the federal government's responsibility for administrative fee costs, providing state and local governments with the "opportunity" to pay for the administration of millions of Section 8 certificates and vouchers.

These cuts will decimate PHA staff services, delete program reserves, and undermine the fiscal stability of hundreds of public housing authorities responsible for thousands of assisted units.

HUD is quick to charge that PHAs receive too much in administrative fees and quicker yet to pursue every means possible to cut these fees, regardless of the impact of these fee cuts on Section 8 program administration. Last year this

Committee instructed HUD to establish an appeals process by which individual PHAs could analyze the impact of the FY86 10 percent fee cut and appeal for partial or full restoration. In its FY87 budget book HUD dismisses the committee's concerns, announces further cuts, finally stating, "the appeals process contemplated by the Senate no longer is feasible and is not being implemented."

This is just not right. The Section 8 existing program is the main delivery system of housing assistance for millions of low income families. After years of effort at every level of government, from this Committee down to the smallest public housing authority, this program is on line and working well. HUD's arbitrary fee cutting actions, its refusal to establish an appeals and fee restoration process as instructed by Congress, and its attempt to legislatively shirk half its fiscal responsibility for underwriting this program are unwarranted actions being taken to dismantle this essential program that houses millions of low income Americans.

This committee must not permit HUD to undermine 15 years of successful local program development through fiscal and administrative sabatoge at the federal level. We respectfully request that you insist that HUD immediately establish a legitimate appeals procedure and we urge you to deny HUD's planned FY87 fee cut for the Section 8 existing certificate program. This is the only fair and legitimate course to protect our committment to effective continuance of this vital housing assistance program.

Thank you for your time and consideration of these issues.

STATEMENT OF SCOTT SKLAR, DIRECTOR, GOVERNMENT RELATIONS SOLAR ENERGY INDUSTRIES ASSOCIATION

SOLAR BANK PROGRAM

Senator GARN. Next is Mr. Scott Sklar, director of government relations, Solar Energy Industries Association.

Mr. SKLAR. Thank you very much, Mr. Chairman. I appreciate the opportunity to testify. I would like to submit my testimony for the record, and just read some highlights for you.

You may be aware that aside from the falling oil prices, the solar industry's tax credits expired at the end of 1985. Although we had a 3-year extension in the House tax bill, and we have bipartisan support in the Senate Finance Committee, this lapse in the tax credit has affected our industry horrendously, particularly the heating and cooling side.

We had 30,000 people directly employed in this industry that is less than 10 years old, and we have 3,000 left. While our competitors in the conventional energy industries still have hard times, we are still being subsidized, but we are not. We have told the Congress that after 5 years, we don't need a subsidy, assuming all things are equal, and we stick to it.

We are in a life or death situation right now. We have one program in HUD, called the Solar Energy and Energy Conservation Bank. As I have stated in my testimony, it has not been the best program, and we have not been overwhelmingly in support of it, the way that it has been carried out by HUD, mostly because the money has been funneled through the States. It has not been promoted, and it has frankly not been pushed to go toward solar, but mostly toward energy conservation.

We are in a situation of survival, and we are asking the committee for 1 year of help. The 1 year of help is to—I know that the committee did not give an appropriation last year, because they did not use all of their moneys, and they had an effective $10 million worth of unobligated money that they have used this year.

We would like the committee to appropriate somewhere near $10 million, basically giving them what they had this year, asking them to take the unobligated monies from that program that they haven't spent this year, and we know that this is the case, and tell them to reserve it for loan guarantees.

What this would do, basically, is maintain a residential market for us by allowing the banks, who are basically willing to give loans, but they have had problems because our loans are so small—these are only $5,000 systems as a national average—we have had problems even working with FNMA which allows higher debt to income ratios for houses with better energy efficiency, but when someone goes for a loan just for solar, the banks mostly shrug and say that these are too small, they are not worth the paperwork, which is not going to help.

We have gone to bankers, we have met with them, and how we get over this hurdle. They said: "If you get some sort of loan guarantee, that saves us the problem of being nervous about collection." Looking at the statistics, very few solar loans go bad, so we don't think that there will be a problem.

Basically, what we are asking you to do is to turn this program over as a loan guarantee program for a year, to build up the market. Hopefully, none of that money actually would have to be spent to pay out the loans, and that will keep us going until the tax thing unravels.

The fact of the matter is right now, we don't have some kind of assistance on loan guarantees, we surely know that there won't be a quick tax bill before the summer ends, our industry, at least on the heating and cooling end, will atrophy and wither and, except for pool heating, won't be around.

I know that you and many of your colleagues here have supported the solar industry. We are sensitive to the budget deficit. We are, hopefully, asking for temporary relief here in taking a program that has been authorized to help us, that has never particularly helped us specifically, and turning it to something that might be useful at a time of need.

This is the basis of my testimony, and it goes much deeper into the problem that we have had with the program, and some of the suggestions. We hope that we can get some relief from the committee for this short term.

Thank you, sir.

Senator GARN. Thank you very much, Mr. Sklar, we appreciate your testimony.

[The statement follows:]

STATEMENT OF SCOTT SKLAR, DIRECTOR OF GOVERNMENT RELATIONS, SOLAR ENERGY INDUSTRIES ASSOCIATION

INTRODUCTION

The Solar Energy Industries Association (SEIA) is the national trade association for the solar thermal and photovoltaics manufacturers and component suppliers. The Association appreciates the opportunity to testify before this appropriations subcommittee concerning the future funding and direction of the Solar Energy and Energy Conservation Bank administered under the Department of Housing and Urban Development.

STATE OF THE U.S. SOLAR INDUSTRY

The U.S. solar energy industry is in a deep crises due to the unexpected expiration of the residential and commercial solar energy tax credits, the decrease of world oil prices, and the public perception that the energy crises is now over. Of the 30,000 people that were directly employed by the U.S. solar industry in 1985, less than 3,000 individuals are currently employed in the manufacturing, sales, and installation of solar energy systems. The sector of the solar industry hardest hit by the expiration of the solar energy tax credits is the residential solar thermal industry where over 90% of solar systems sold were used to heat water. Because the solar residential and business credits were extended for three years in the House Comprehensive Tax Reform package and for ten years in the Senate Finance Committee, many consumers will not purchase solar systems until the credits are supposedly reinstated. Lower oil prices are changing consumer attitudes to abandon energy conservation purchases regarding their homes and automobiles. Since the overwhelming majority of solar thermal companies are small businesses, they do not have the resources to maintain their operations until the tax bill winds its way through the Congress towards the end of 1986. Some companies have thus focused on niche solar markets in 1986 such as pool heating or the new construction market but these markets are orders of magnitude smaller than the 1985 residential solar retrofit market. Some other companies diversified into other products -- some in energy, some not related -- but a greater number of companies have laid off most of their employees while frantically trying to sell and service their equipment. The Solar Bank can effectively aide the U.S. solar energy industry at this time of crises and I hope this subcommittee will support our industry in this regard. How sad it would be to allow the U.S. solar industry to atrophy at a time when the industry has surmounted the technological hurdles, has received market acceptance as evidenced by our sales in retail chains such as Sears and Roebuck, Burdines, Wannamakers, and Woodward & Lothrup, and has received consumer acceptance with over $700 million in residential solar sales in 1985.

HISTORY OF THE SOLAR BANK

As the subcommittee members know, the Solar Energy and Energy Conservation Bank was conceived by Representative Stephen Neal who introduced the original legislation which received bipartisan and geographically diverse support in the Congress. A president of the Solar Bank was not appointed till 1980, and the Bank adopted an approach that detrimentally effected the Bank's usefulness in promoting solar applications. In addition to dispersing monies through the states, allowing extreme variations in state programs and combining Bank funds with existing programs, and proposing regulations prohibiting the funding of active solar applications, the Bank had not effectively promoted their program and use of Bank monies has been low as a result.

The Solar Energy and Energy Conservation Bank was an important part of a three prong approach towards the development of solar energy. The first prong was the Department of Energy R&D program to perfect the solar technology in order to make it as efficient and cost effective as possible. The second prong were tax credits to prime the "upper income" market that utilize tax incentives to guide their investments, and the third prong was the creation of the Solar Energy and Energy Conservation Bank to offer low-cost financing for energy conservation and solar applications for the part of the U.S. population that was not eligible for low-income energy conservation programs or could not utilize tax incentives--which is the largest part of the consuming public! Because of poor leadership, regressive regulations, and poor promotion that prompted numerous law suits and Congressional battles, the Solar Energy and Energy Conservation Bank has not met its potential and has been rather insignificant in its assistance to the solar industry.

THE INDUSTRY PROPOSAL

The Solar Energy Industries Association on behalf of the U.S. solar industry requests that the Solar Energy and Energy Conservation Bank receive a $10 million FY'87 appropriation, and that this appropriation along with unobligated FY'86 monies be used for loan guarantees for energy conservation and solar energy applications. Our proposal is entirely permissable under the authorizing legislation of the Solar Bank and I have enclosed two letters from Rep. Stephen Neal in this regard.

At this critical time for the solar industry, such loan guarantees would spur solar sales, maintain solar's inroads in the major retail chains, and sustain the U.S. solar industry. Since these monies would be for loan guarantees, SEIA believes this money reserve could be maintained without increasing appropriations for the Solar Bank year after year. SEIA has been advised by major banking representatives that loan guarantees are essential to finance residential solar applications because these loans are much too small to warrant the risk and paperwork.

In addition, the Bank program for the last six years has been only minimally helpful to the solar industry. In states such as Massachussetts and Michigan, the Solar Bank has helped finance a large number of solar systems. But in the other states, the Solar Bank has not had much if any impact at all. This minor impact is due to a lack of support of active solar applications by the Bank staff, prohibitive regulations, and lack of promotion and direction to the states in regard to solar energy. In spite of clear statements by the solar industry to the Bank's staff and advisory boards, the situation has not changed over time. However, if domestic sales of solar energy are not increased at all in the short term, there is a very good chance that the American solar energy industry will atrophy only to be supplanted by other energy sources chiefly from imports. How ironic that solar technology ceated in America and supported through federal research and development programs to firmly establish solar in the American marketplace to displace oil imports would now be allowed to whither to only a fraction of its size allowing oil imports to increase again.

CONCLUSION

The U.S. solar industry needs support to maintain the production of residential solar equipment. The solar tax credits have expired on December 31, 1985 which have cut sales by over 80%. The Solar Energy and Energy Conservation Bank program has not been useful in helping sales of solar equipment even though it was created, in part, for this purpose. The original authorizing language for the Solar Bank allows the Bank to offer secondary financing and guaranteed loans. If $10 million were appropriated along with unobligated monies for solar energy and energy conservation applications in FY'87, the Solar Bank would be more effectively assisting our industries in the marketpalce.

If the Solar Energy and Energy Conservation Bank does not become market oriented, the solar industry questions the need for the program as it now stands.

Letters From U.S. Congressman Stephen L. Neal of North Carolina

March 12, 1986

Mr. Scott Sklar
Director of Government Relations
SEIA
Sute 503
1717 Massachusetts Avenue, N.W.
Washington, D.C. 20036

Dear Scott:

I want you to know that I agree that a loan guarantee program conforms with the original intent of the Solar Bank concept. In a recent letter to the House Appropriations Subcommittee on HUD -- Independent Agencies, I suggested that the Subcommittee should urge HUD to set up a secondary financing market for Solar Bank loans.

Thank you so much for all your help.

Best wishes,

Steve

STEPHEN L. NEAL
U.S. Congressman

February 26, 1986

The Honorable Edward P. Boland
Chairman
Subcommittee on HUD -- Independent Agencies
H143 Capitol
Washington, D.C. 20515
Dear Mr. Chairman:

Dear Mr. Chairman:

This is to request that the Subcommittee consider providing a modest appropriation for the Solar Energy and Energy Conservation Bank.

As you are aware, the Subcommittee recommended funding the Solar Bank at a level of $25 million for fiscal year 1986. You are equally aware that the funding level was reduced to zero in the Conference. Funds remained available to the Bank through the current fiscal year, however, primarily because HUD's attempt to redirect Solar Bank funding to other programs failed. HUD was forced by the courts to apply uncommitted Solar Bank funds to the Solar Bank program.

Mr. Chairman, we worked hard to develop the Solar Bank concept and it was a difficult but significant struggle to preserve the Bank from a hostile administration. The states and terroritorial entities of the United States that have Solar Bank programs have made good use of these limited funds. The Solar Bank is important to the economic future of our country, both in promoting the development of new energy industries and in changing attitudes in the construction and finance industries. It is foolhardy to consider permanent the current glut in oil supplies and the concomitant decline in oil prices. We would be derelict if we did not try to help prepare our nation for the inevitable decline in the supply of oil, which is central to our national security.

The many supporters of the Solar Bank recognize the essential role you have played in defending the program in the face of opposition by HUD and your Subcommittee's Senate counterpart. I urge you to continue that battle.

One final note: in order to stretch the value of future Solar Bank funding, the Subcommittee might consider urging HUD to apply at least part of the funds to the secondary finance market, as was provided in the original authorization.

Thank you for your consideration and assistance.

Best wishes,

Steve Neal

STEPHEN L. NEAL
U.S. Congressman

STATEMENT OF ALAN KAUFMAN, CHAIRMAN, ADVOCACY COMMITTEE, NEW JERSEY MENTAL HEALTH ASSOCIATION, AND EXECUTIVE DIRECTOR, SERV CENTERS OF NEW JERSEY, ON BEHALF OF CONSORTIUM FOR CITIZENS WITH DEVELOPMENTAL DISABILITIES

HOUSING FOR THE ELDERLY AND DISABLED

Senator GARN. Next, I would like to invite Alan Kaufman to come to the witness table, New Jersey Mental Health Association and executive director of SERV centers, appearing on behalf of Consortium for Citizens with Developmental Disabilities.

Mr. KAUFMAN. Good morning, Mr. Chairman.

Senator GARN. Good morning.

Mr. KAUFMAN. My name is Alan Kaufman, and I am chairman of the Advocacy Committee of the New Jersey Mental Health Association, and executive director of SERV centers of New Jersey, a mental health residential service provider in New Jersey.

I am this morning representing the Consortium of Citizens with Developmental Disabilities, and speaking on their behalf. The consortium represents 50 consumer, provider, and professional organizations advocating on behalf of our Nation's disabled.

As we all know, the President's current budget proposals, if enacted, would terminate section 202 programs for housing of the elderly and the disabled. It would terminate section 8, the rental rehabilitation program, and congregate housing services. It would, furthermore, freeze existing section 8 at the current fair market rental value.

If allowed to stand, housing aid for our Nation's poor, the elderly, and disabled would have been cut by 91 percent since fiscal year 1980. The budget proposals are absolutely devastating to our disabled. We must remember that approximately 8 million of our citizens are severely disabled in this country. Persons with handicaps are the most inadequately and inappropriately housed segment of our American society.

We must remember that 15,000 community residential facilities exist nationwide, but hardly one has anything but an excessive long waiting list.

We also have estimates that between 250,000 and 3 million citizens are currently homeless in this Nation. The Department of Health and Human Services' analysis of local studies themselves has indicated that between 25 and 40 percent of this homeless population are currently suffering from mental illness.

There are over 300,000 disabled persons institutionalized unnecessarily today, this morning, due to lack of appropriate housing and support services in the community, and much of the cost of that inappropriate and unnecessary institutionalization is borne by Federal funds.

The President's budget is simply a wholesale attack on critical housing programs for poor people, many of whom are disabled. Without question, approval of this budget in its current form would drastically increase homelessness in this country, and reinstitutionalize thousands of our disabled who do not need that intensive service.

EXPERIENCES IN NEW JERSEY

On a local level, allow me to describe our experiences in New Jersey, and the effects of Federal housing programs, or rather the lack of Federal housing programs, for our mentally ill and disabled population.

SERV centers of New Jersey is a mental health residential agency providing group homes, supervised apartments, and family care services to mentally ill adults returning to the community from county or State psychiatric institutions, or who, without these services, would be eminently threated by institutionalization.

Operating in four separate counties in New Jersey, we currently this morning provide services and house 325 clients in over 85 leased and owned facilities. In our programs there are waiting lists of a minimum of 6 months and a maximum of 1 year for these spaces. But no one can await housing. The result of a waiting list in a housing program for community residential facilities means that people either remain in hospital at additional expense, and additional cost to their lives and productivity, or they wander our streets.

Recent surveys in New Jersey of level of care have indicated that 1,100 patients currently in our State and county in-patient facilities need not be there. Eleven hundred individuals can live more independently, more safely, and more productively in the community, if given long-term support of housing and services.

The costs in New Jersey institutions is now approximately $48,000 per year per patient. For 1,100 individuals who need not be there that totals $53 million. The cost in the community is approximately $18,000 per year per person. For these 1,100 persons who need not be in the institution, the cost would be $20 million. The savings could be as high as $30,000 per person per year, or in this case, in New Jersey, $33 million. We must remember that a good portion of those funds are Federal funds.

The absence of housing in New Jersey is very expensive to the State government, to the Federal Government, and to the counties and municipalities, and more to the individuals themselves.

In housing, specifically section 202, it is vital that facilities be encouraged for our mentally ill, and some of our other disability groups, which are smaller facilities, scattered facilities. To do so, we need a refinement of HUD procedures, which currently lack efficiency and effectiveness for smaller facilities. Their formulas just don't work.

We do applaud Senate initiatives to separate the mentally ill from the section 202 program, and provide for those services, and we heartily support those efforts.

In New Jersey, also, the vacancy rates for apartments are now less than one-half of 1 percent. Competition, as a result, is fierce for rental units, and the result is that rents have moved upward. section 8 certificates for rental assistance would become nonexistent by the proposed budget, making the disabled even more at a disadvantage. Even existing certificates are in a severe problem in our State because the fair market rental values are too low, and clients cannot locate appropriate apartments that fall below the fair market rental value.

The President's budget would freeze the FMR's, exacerbating an impossible situation in our State. Ironically, the few certificates which are still available for section 8 have become useless to our clients. They simply cannot locate any apartment under the current FMR which still meets sanitation and building requirements.

In New Jersey, to feeze the fair market rental value is the same as eliminating it.

The most critical mental health need in New Jersey has also been identified as housing and supportive services. The President's budget, we are certain, would result in incalculable costs, in increasing homelessness, and increasing Federal resources to solve that problem.

We need to acknowledge the lack of availability of housing for New Jersey and for our Nation, for our Nation's poor, and for our disabled. We must not accept Secretary Pierce's recent statement that affordability and not availability remains the dominant problem for the poor. In New Jersey at least, affordability is not an issue, there is nothing to afford.

We recommend, from the consortium, that this subcommittee not support the President's proposed budget, and that we not decimate housing programs for our disabled. We request the restoration of section 202, that we restore section 8, that we restore the Congregate Housing Services Program, the community development block grant, and that we not freeze the fair market rental rates for existing section 8. In all due conscience, we can do no less.

Thank you.

Senator GARN. Thank you very much, Mr. Kaufman. We appreciate your being here today.

[The statement follows:]

STATEMENT OF ALAN KAUFMAN, CHAIRMAN, ADVOCACY COMMITTEE, NEW JERSEY MENTAL HEALTH ASSOCIATION, AND EXECUTIVE DIRECTOR, SERV CENTERS OF NEW JERSEY

ON BEHALF OF

Association for Retarded Citizens/U.S.
Center for Law and Social Policy
Epilepsy Foundation of America
International Association of Psychosocial Rehabilitation Services
Mental Health Law Project
National Alliance for the Mentally Ill
National Association of Private Residential Facilities for the Mentally Retarded
National Association of State Retardation Program Directors
National Mental Health Association
National Society for Children and Adults with Autism
The Association for Persons with Severe Handicaps
United Cerebral Palsy Association, Inc.

SUMMARY OF CCDD RECOMMENDATIONS

The CCDD Task Force on Housing repectfully submits the following recommendations to the Subcommitte on HUD-Independent Agencies of the House Committee on Appropriations:

- An appropriation of $656.9 million in new loan authority for the HUD Section 202 Direct Loan Program for FY 1987.
- Opposition to the termination of the Section 8 certificate program and an appropriation of $10,218.0 million in FY 1987, incorporating a 4.1 percent inflationary increment.
- An appropriation of $4.27 million for Congregate Housing Services in FY 1987.
- An appropriation of $3252.1 million for the Community Development Block Grant in FY 1987.

My name is Alan Kaufman, and I am chairman of the Advocacy Committee of the New Jersey Mental Health Association, an affiliate of the National Mental Health Association, and Executive Director of SERV Centers of New Jersey, a mental health residential service agency providing commmunity-based group homes, supervised apartments, and family care services to over 325 clients with mental illness in four counties in New Jersey. I am speaking before you today as a representative of the Housing Task Force of the Consortium of Citizens with Developmental Disabilities and on their behalf. We are very much concerned with maintaining and expanding the housing resources available for people with disabilities and are most appreciative for the opportunity to share those concerns with you.

The Consortium for Citizens with Developmental Disabilities (CCDD) is a working coalition comprised of fifty consumer, provider and professional organizations which advocate on behalf of people who are developmentally disabled. The CCDD has been in existence since 1973, advocating for this population in a variety of areas including the appropriation of sufficient federal funding to assure that our nation's citizens with disabilities can access adequate housing.

Many of the people with disabilities represented by our organizations are poor and are dependent upon federal funding to meet their needs. People with disabilities need the maintenance and continuance of the federal presence that is not being provided by states and localities and the private sector.

Approximately 7.9 million persons in the United States are considered to have severe disabililities. These are people who are unable to conduct some major activity of daily living. Many, if not most, of these individuals require some special accomodation in housing. There are long waiting lists for most of the more than 15,000 community residential facilities for persons with developmental disabilities across the nation. For years, there have been people waiting for affordable and accessible housing in virtually every city and locality across the country.

Securing appropriate housing is a major prerequisite to social integration and living independently for persons with disabilities, yet after more than a quarter century of federal involvement in developing specialized housing designed to meet the unique needs of these populations, people with handicaps continue to be among the most inadequately and inappropriately housed segments of American society.

Available data suggest that the costs of providing appropriate housing options for people with disabilities are well worth the investment because of the significant saving that may be engendered by enabling people with disabilities to live in the community, get jobs, and pay taxes. The lack of appropriate housing opportunities for individuals with disabilities frequently results in the unnecessary and expensive institutionalization of such persons usually with the support of federal dollars There are estimates that over 300,000 persons with handicapping conditions are unnecessarily institutionalized due to a lack of appropriate housing arrangements.

The inadequacy of housing options for people with disabilities has contributed to a growing problem among people with a full range of disabilities, especially people with mental illness: homelessness. Although there are no reliable national surveys, it is estimated that the number of homeless persons in this country ranges between 250,000 (U.S. Department of Housing and Urban Development) and 3 million (National Coalition for the Homeless) persons. According to an analysis prepared by the Department of Health and Human Services of local studies conducted in several major metropolitan areas of the United States, between 25% and 40% of homeless single adults are mentally disabled. They are generally among the most vulnerable and disabled of the homeless population and are of particular concern to us. This population, unlike those who are temporarily traumatized by being homeless, risks the regression of serious long-term disability and sometimes death on the streets.

Despite this obvious and critical need for low income and specialized housing, subsidized housing is slated by the Administration for severe cuts under the FY 1987 budget, an almost $9 billion is proposed between fiscal 1986 and fiscal 1987. If the President's budget were enacted, budget authority for housing aid from fiscal 1980 to fiscal 1987 will have been cut by more than $24 billion, or 91 percent.

The President also proposes termination of the Section 202 program, despite the fact that deinstitutionalization mandates and rates of homeless people with disabilities are increasing pressures on an already inadequate supply of specialized housing. Similarly, the Administration proposes termination of the Section 8 housing assistance program, and the Congregate Housing Services program which would place in jeopardy people currently living in the community, placing them at risk of more expensive, usually federally funded, institutional care.

Under the President's budget, inadequate and yet unproved system of voucher payments would offer the only avenue for incremental units.

The President's budget thus results in a wholesale attack on critical housing programs for poor people many of whom are disabled. Without question, such action would add significantly to the numbers of people wandering our streets with no home.

CCDD is encouraged, however, by the Senate Budget Committee's actions to restore some of this funding. While we do not believe the Committee budget provides sufficient funds for low-income housing and housing for people with disabilities, it does at least restore the Section 202/8 programs to previous levels, and reduces the cut-backs in other areas.

Today, I would like to discuss the problems of establishing housing for people with disabilities from my own experience in New Jersey, and to make recommendations on behalf of CCDD with respect to federal housing programs which aid this population.

In New Jersey, I have been responsible for developing, implementing, and operating a series of group homes, supervised independent and semi-independent apartment programs, and adult family care services for persons with chronic mental illness capable of living with the community. Operating in four counties, a total of 325 clients are housed in over 70 agency owned or leased facilities, with all receiving ongoing staff supervision, counseling, case management, training in activities of daily liviing, and other support services, designed to both improve individual levels of functioning and,where appropriate, to assist each person in reducing his/her dependence upon the mental health /social support systems.

In providing these services I have become most acquainted with the difficulties of establishing and operating housing for persons with mental illnesses. Ironically, most of these problems have little to do with the emotional difficulites of our clients, but rather to issues of community resistance, the stigma associated with mental illness, and, most importantly, to the policies, procedures, and practices of governmental entities whose mandate is often the same as ours.

In September 1978, SERV CENTERS of New Jersey received a section 202 fund reservation to construct or substantially renovate a small apartment buiding to accomodate 20 clilents plus live-in staff supervisors. After more than 8 1/2 years, that project is only now nearing completion-- a product of continuous and highly frustrating difficulties inherent within HUD procedures designed for larger facilities. It is critical that these programs be continued but it is equally vital that procedures be altered so as to facilitate these necessary smaller structures for persons suffering mental illness and for other handicapped citizens.

Perhaps because HUD's staff are rated in performance based upon the numbers of units produced, smaller projects risk becoming a lesser priority and therefore can incur substantial delays. The reason for this may be the fact most of the approval reviews and procedures require similar efforts by HUD staff regardless of project size. If performance is rated on numbers of units in a project, and efforts are similar for all sized projects, priority will rarely be given to the smaller facitlity needed by the disabled. As a result, delays in proccessing occur often and each delay, then requires new submissions of materials and documents which have become outdated. This occured in our project on three separate occasions.

As regulations or policies become altered, they often become effective for all projects not yet completed and neccesitate revision to previous documents or plans already approved and acted upon. In our case, new cost containment guidelines, regardless of their well intended purpose, came dangerouosly close to ending a project previously appproved and begun.

Lack of coordination within various regulatory agencies, and sometimes within the same agency, has also caused substantial problems. Again in our instance, a proposed sight was rejected by HUD due to blighting influences in the neighborhood-- with the suggestion that if this area could be included within the capitalized neighborhood strategy area (NSA) of the city of Trenton the sight would be approved. Unfortunately, the city has already included this area in the NSA, but it was eliminated by another office of HUD because the neighborhood was not sufficiently blighted.

The experience with the Section 8 rental assistance program has also been frustrairing in Ne Jersey. Similar to Section 202, this program is most valuable and desparately needs to be continiued, but some alterations in its operation need also be considered. The primary difficulty stems from the approved FAIR MARKET RENTAL VALUE (FMR) under which an apartment rental fee must fall for a CERTIFICATE of PARTICIPATION to be utilized. In New Jersey, the vacancy rate for apartments is generally under one percent and in many counties is under 1/2 of one percent. As a result, rents charged for the few apartments available are uniformly above the current FMR rates now imposed. Procedures are needed to more rapidly adjust FMR rates and to make those rates increasingly sensitive to the rental market, and to establish specific and responsive set-aside programs reserving a portion of Section 8 for the disabled.

Federal Programs

The need for the federal government to continue to be actively involved is clear since the private sector simply has not produced enough affordable housing, especially units designed with the supportive living environments necessary to assure that the elderly and handicapped can maintain their highest level of independent living. These supportive living environments include specialized features such as grab bars, extra wide doorways, and high intensity lighting, coupled with appropriate services which are either too costly or simply not available in existing housing.

Recognizing this need, Congress last year soundly rejected the Administration's proposal for a two-year moratorium on Section 202 housing by providing 12,000 new units for persons who are elderly and handicapped. This was a clear expression of support and recognition that federal savings result from preventing premature and inappropriate institutionalization.

Section 202/ Section 8

Section 202 of the Housing Act of 1959, as amended, provides direct loans to nonprofit organizations to construct or rehabilitate and manage housing for low-income persons who are elderly or who have handicaps. Housing developed for people with disabilities must be small and located in residential areas, thus supporting the deinstitutionalization movement, and contributing both to more appropriate independent living opportunities and to a less expensive community-based service and housing system. The Section 202 program has been successful in setting standards for housing design, service delivery, and in general, for the quality of life for people with special housing needs. Furthermore, a 1984 HUD report recognized the need for other than private sector assistance in the development of appropriate housing alternatives for people with handicaps.

Because housing development for handicapped individuals has increasingly focused on small group homes and apartments, we are supportive of legislation that would establish separate standards and procedures for handicapped housing. The Section 202 guidelines, heretofore, have been predicated upon the needs of the large congregate elderly facilities, creating ongoing problems in the application to these small handicapped projects of the fair market rent schedules, the cost containmnet directives, and the management requirements.

Section 202 is important both because it is the only capital financing mechanism within HUD specifically designated for housing development for people with handicaps and because it is administered in tandem with the Section 8 New Construction Program assuring ongoing rental subsidies.

Section 8 Housing Assistance Payments support not only people who live in housing constructed through the Section 202 Loan program, but also enable many persons with disabilities to live in certified apartments and public housing. Persons depend upon Section 8 certificates to supplement their rental payments. Most of these individuals would be in more restrictive and more expensive living arrangements were the rent certificates not available. This is, therefore, a cost-effective way of serving low-income persons who are disabled.

For several years the Administration has proposed converting all of Section 8 to a voucher program, arguing that the federal government would be better able to support larger numbers of persons who are truly needy. The conversion has been opposed by CCDD and others because it would eliminate the two-prong purpose of Section 8 certificates: to provide affordable housing while stimulating the housing industry to develop a more adequate stock of housing. Persons with physical disabilities simply cannot find barrier free housing in their local communities. Housing that offers the term limitation and payment standard versus unit cost basis of the vouchers does not measure up to the current benefits of the existing Section 8 Program for people with disabilities. Further, the Administration proposed voucher system fails to offer the necessary incentives for private sector development of specialized housing for people with handicaps which now exists under the Section 202/8 programs and the moderate rehabilitation program. As a final concern, the President's budget projects a total of 50,000 incremental units under the voucher program for FY 1987, approximately 17 percent fewer new units than the total actually funded in 1985 under all the HUD programs vouchers would replace. The Administation's proposal cuts both the potential supply of low-income subsidies and the incentive for development of specialized housing and will result in the consignment of people with disabilities to more expensive, otherwise publicly-funded institutions or, as is happpening in increasing numbers, to the streets.

In addition to his failure to request FY 1987 funds for the Section 202/8 programs, the President is acting in a manner which will dismantle the program through unprecedented use of deferrals and attempted use of recissions. We urge the Congress to act now to prevent these destructive proposals, and to allow HUD to proceed immediately with the fiscal 1986 section 202 program, as agreed to both by Congress and the President last December. The House is acting to disapprove the deferral, of all new loan authority for the 202 program and for Section 8 and which action is also needed in the Senate if the funds are to be released in time for applicants to have the time to go through the approval process by the end of the fiscal year. Time is now growing short if this program is to operate as Congress intended in FY 1986.

The Administration has proposed termination of the Section 202 program at a time when deinstitutionalization mandates and rising rates of homeless people with disabilities are increasing pressures on an already inadequate supply of specialized housing. The $54.6 million which appears in the budget would authorize loans only for approved amendments to projects already in the "pipeline," eliminating any future development.

For FY 1987, the CCDD recommends an appropriation of $656.9 million in new loan authority for FY 1987 for Section 202, and $10.218 million for Section 8. In the last ten years, the gradual reduction in funding of new loan authority under Section 202 has resulted in a 60% reduction in the number of new units funded annually. CCDD's recommendation for FY 1987 is for an inflation increment to allow approximately level production of 12,500 new units. Termination of such a crtical program at this time would not be in keeping with the Administration's own analysis of the need or with the increasing concerns of citizens with handicaps who have nowhere to go.

Congregate Housing Services

This program provides funding for essential supportive services (meals, transportation, and personal care and housing assistance) to housing units developed through the HUD Section 202 loan program and through Public Housing Authorities. Three to five year contracts have been awarded to eligible housing managers to assure that necessary services would be available to tenants who are elderly or who have handicapping conditions.

The Administration is recommending termination of the program which will place in jeopardy people currently living in the community with the assistance offered under the program, placing them at risk of more expensive, usually federally funded, institutional care.

For FY 1987, CCDD recommends the appropriation of $4.27 million for Congregate Housing Services. As people with more severe disabilities move into the community, there is a growing need for more services which increase access to and use of community-based housing. Funding for one of the major sources of assistance for support services, the Title XX Social Services program has been reduced substantially since the program was converted to a block grant in 1981. In-home services necessary to assure recipients' ability to fully access housing through HUD funded under Medicaid programs have not been uniformly available, and state and county governments have been hard pressed to fill the funding gaps created by reduced spending on human services. At a minimum, funding should be returned to the FY 1985 levels, with the addition of OMB's 4.1 percent inflation figure.

Community Development Block Grant

This program provides grants to units of general local government and states which includes the funding of activities frequently managed or operated by non-profit organizations assisting people with developmental disabilities such as acquisition or rehabilitation of buildings used for group or independent living arrangements, for shelters for people who are homeless, and day activity centers. The Administration has proposed what amounts to a 1/3 reduction in the program for FY 1987.

CCDD recommends an FY 87 appropriation of $3252.1 million for the Community Development Block Grant. People who have developmental disabilities have benefitted from the establishment of residential and day treatment centers that would otherwise not have been available for their use. CCDD is concerned not just with the amount of the proposed reduction but also with the Administration's proposed limitation of entitlement areas and expanded recommended CDBG fund use, including rental subsidies. Without the CDBG program, fewer of the much needed housing, treatment centers, and workshops for sheltered employment will be developed and more people will be homeless, in institutions, and lacking services.

Secretary Pierce, upon presenting his FY 87 budget, announced that "Affordability, not availability, remains the dominant problem for the poor." As the numbers in our testimony have clearly demonstrated, this statement is simply contrary to fact. The organizations I speak for today feel strongly that availability is more serious a problem than affordability. There is a severe shortage of housing for disabled people in this country and the federal government has a resposibility to something about it. We can no longer ignore the painful reality of this increasingly serious social problem.

STATEMENT OF JANICE PURNELL, EXECUTIVE DIRECTOR, AKRON METROPOLITAN HOUSING AUTHORITY, AND COUNCIL OF LARGE PUBLIC HOUSING AUTHORITIES

Senator GARN. Next we will hear Janet Purnell, Executive Director, Akron Metropolitan Housing Authority, Council of Large Public Housing Authorities.

It is nice to have you here today, if you would like to proceed.

Ms. PURNELL. Thank you, Mr. Chairman.

I am Janet Purnell, the executive director of the Akron Metropolitan Housing Authority in Akron, OH, and I am testifying today on behalf of the Council of Large Public Housing Authorities. The council was originally founded in 1981 and today it includes 42 large PHA's, and is responsible for the management of some 40 percent of the conventional public housing, as well as another 150,000 units of section 8 existing and mod rehab rental assistance.

I would like to thank the chairman for the opportunity to appear today, and to begin by indicating that CLPHA has been well pleased with the commitment of your committee in terms of the support more specifically of substantial and regular funding of the modernization program.

PEOPLE ELEMENT EMPHASIZED

I think the bottom line that we are addressing today, by virtue of the impact of the proposed budget cuts, the concept of deferral and the rescissions, is what will happen in the lives of people. In the testimony that I have provided to your committee, I have attempted to give emphasis to the people element, as opposed to the generic, numerical element in our consideration.

I think that we have a serious dichotomy of existence in that during the course of the 4-year tenure, or nearly 4-year tenure that I have served in the housing industry as an executive director, there has indeed been a sweeping reform in terms of moving PHA's in the direction of greater fiscal accountability, in terms of the mandate for long-range planning, and other measures set in place that will improve the efficiency and accountability of the PHA's in the provision of public housing.

It would seem that just at the point of a yield in terms of the kind of turnaround that have been effected, we are in a climate of governmental spontaneity that threatens to instantaneously dismantle the system that has been perfected during the course of my tenure.

I would like to highlight some of the areas of emphasis that appear in my testimony.

STATEMENT HIGHLIGHTED

CLAPHA is concerned about the fact that if substantial fiscal year 1986 CIAP funding is deferred, coupled with the fact that CDBG funds are being rescinded throughout our cities, the problem this creates is that these are the two major resources who assume the responsibility for impacting upon the rehabilitation of existing stocks in our cities. We are simultaneously canceling out both resources.

As relates to the proposed deferrals and rescissions, we would ask that you continue to reject the concept of deferrals for public housing, and that HUD be charged to release the fiscal year 1986 CIAP funds immediately and at the originally appropriated funding levels.

We ask further that HUD should not be permitted to attempt to introduce a lead paint hazard removal priority as a requirement of the fiscal year 1986 CIAP program, but rather that it spread the addressing of this problem over a period of several years inasmuch as its cost has been estimated to be well over $1 billion.

As relates to operating subsidy, CLAPHA's member organizations ask your commitment to the rejection of a proposed cap on allowable expense levels. We feel that the Federal Government must accept its responsibility to provide adequate funding to cover actual costs beyond formula specified inflation rates. For example, most authorities now are part of the insurance crisis, the Akron Metropolitan Housing Authority being among those. We feel that it is less than responsible for HUD to encourage and to provide waivers that encourage PHA's to go bare as relates to insurance.

So we would ask that a resource be considered to that there can be some support on behalf of the Federal Government in this regard.

As relates to the sustaining of the CIAP concept, we would ask that the committee encourage that HUD complete and release the Abt modernization study, and that HUD defer the development of a policy until after the release of that study, and that PHA's have the opportunity to have input and to collaborate in the development of that policy.

SECTION 8 REDUCTIONS

In terms of the impact of the section 8 reductions, I believe, in 1985, in your appropriations report, there was a request that HUD justify the cutting of section 8 administrative fees. To our knowledge, the development of that report has never occurred. We would ask that that request be renewed with HUD, and that there be a rationalization and a presentation of a plan that will do other than dismantle this program, which provides housing as an alternative in the wake of the declining availability of new construction funds.

I have provided, in my testimony, copies of letters from both major and other landlords with small holdings in the section 8 program, demonstrating that already, in anticipation of the fair market value rent freezes, landlords are starting to turn away section 8 certificate holders. This would also have some serious implications for the forthcoming holders of the free-standing vouchers, and the PHA's are dependent upon the administrative fees to be able to provide qualified staff who will do the appropriate job of monitoring the quality of housing provided by these private landlords.

We realize that many times there is a question as to whether the investment in public housing is a waste of taxpayer money. I would submit to you that it has been my experience in the brief tenure of 4 years, and in the wake of HUD's building in appropriate measures to monitor and encourage excellence, that indeed we are responding appropriately as a caring society, and we should do no less for those who are less fortunate among us.

I thank you again for the support of your committee, and for the opportunity to appear.

Senator GARN. Thank you very much for your testimony. It has been helpful.

[The statement follows:]

STATEMENT OF JANET PURNELL, EXECUTIVE DIRECTOR, AKRON (OH) METROPOLITAN HOUSING AUTHORITY, ON BEHALF OF THE COUNCIL OF LARGE PUBLIC HOUSING AUTHORITIES

Mr. Chairman, Honorable Members of the Committee, committee staff, and invited guests --

My name is Janet Purnell and I am the Executive Director of the Akron Ohio (Metro.) Housing Authority. I am testifying today on behalf of the Council of Large Public Housing Authorities (CLPHA). CLPHA was founded in October 1981 and now includes 42 large PHAs which together manage about 40% of the conventional federal public housing stock and another 150,000 units of Section 8 "existing" and "moderate rehab" rental assistance. The Akron Metro. Housing Authority is the fourth largest PHA in the state of Ohio. We operate in six cities and one Township in Summit County, handling 3,841 units of conventional public housing, 2500 units of Section 8 rental assistance, 430 units of leased housing and 527 units of scattered site housing. I have been the Executive Director since October 1982.

Mr. Chairman, I realize that the time available today is short, so I will limit these comments to a few subjects and would then be pleased to respond to any questions that you, the other members of the Committee or your staffs may have. I appreciate this opportunity for CLPHA to testify before the Committee. Each year we bring back to you many of the same concerns, but each year also seems to bring its own unique problems . Today I would like to discuss the following subjects.

1) public housing in Akron Ohio;

2) HUD's proposals to defer or rescind public housing funds;

3) needs for public housing operating subsidy;

4) sustaining the concept of the public housing modernization (CIAP) program;

5) the impact of reductions in section 8 program funding; and

6) special needs for services in elderly public housing.

1. Public Housing in Akron, Ohio

In Akron, public housing plays a very important role in meeting the need of our low-income families and elderly households. Low-income households in the entire Akron region experience a very difficult time finding suitable housing at rents they can afford, especially larger families. We currently house 17,000 low-income people and 3,000 elderly persons. In addition, our waiting list contains 2,500 households, including primarily ADC families, handicapped persons and limited numbers of seniors. Were we to reach 100% occupancy tomorrow, there would be no safe, decent sanitary housing for at least 2100 of our current applicants. In February of 1985, the AMHA closed its applications window because of the unethical futility of the situation. When we have occasion to reopen the window, we get an average of 75 to 150 new applicants per day.

Unlike many PHAs that belong to CLPHA, our units are not primarily located in large hi-rise developments. Instead, we have 32 developments scattered throughout many different communities. The average size of our developments is 225 units. Over the last five years we have received a total of $5.7 million in CIAP money to modernize our developments, and we have used it to establish an energy management system in all of our senior hi-rise developments, rehabilitate over 475 scattered-site homes, and conduct lead-based paint and asbestos abatement programming. We've also re-roofed over 2,000 units of housing. As a result, the condition of our developments is currently basically stable, although we still have major needs remaining.

We would like to expand the supply of public housing in our area, but find that difficult, first because of HUD's efforts to shut down the development program, and second because of continuing resistance on the part of some of our local communities. This makes it all the more important that we be able to maintain the housing stock that we already have, inasmuch as AMHA is the major provider of safe, decent and sanitary low-income housing in Summit County. We also make successful use of 2,500 units of Section 8 rental assistance in our communities, and would like to see this program expanded in the future, although we fear the potentially serious consequences of HUD's failure to provide adequate administrative fees and annual adjustments to the Fair Market Rent levels.

The City of Akron has documented an unmet need for rental subsidies to house 9,824 families. Having faced a $5.7 million loss of CDBG funds through rescission this year, Akron's hope rests in the attraction of increased rather than diminished numbers of responsible landlords into the Section 8 existing program. AMHA currently collaborates with the government of Summit County in the Administration of 40 units of rental rehab., and 50 units of Section 8 existing units in Project Self-Sufficiency, as well as participating in a 48-unit rental rehab. program with the city of Akron.

2. HUD's proposed deferrals and rescissions.

Mr. Chairman, HUD has proposed major rescissions and deferrals of FY86 public housing funding. We are very pleased that neither the House nor the Senate has approved these rescissions. We understand that OMB has now apportioned the undeferred funds, and we are hopeful that HUD will not delay the release of these funds further, but will allocate them quickly in proportion to your original FY86 appropriation. We would also ask that your Committee take strong, positive action to reject the deferrals. It is my understanding that within the public housing program the proposed deferrals would affect only the Modernization (CIAP) program, and would only postpone the expenditure of these funds until either later this year or until FY87. They would still have to be spent at that time. Mr. Chairman, most of our PHAs have staffs that are employed to work on planning or implementing the modernization program. We benefit greatly when there is a relatively constant and predictable level of activity from year to year because this enables us to maintain a stable and high quality professional staff and to carry out our modernization activities on a predictable basis. HUD itself recently established an expanded five-year comprehensive planning requirement that covers the entire CIAP program. The purpose of these plans is to introduce more rationality into the modernization process. It creates havoc with our modernization planning and implementation activities, however, when HUD tries to turn the spigot on and off, erratically and unpredictably, or in this case to push back the release date of CIAP funds by several months without reason. We appreciate and thank you for this Committee's strong support in the past in appropriating CIAP funds at substantial, regular levels over the past six years, and we again ask you to reject the deferrals now being proposed by HUD.

One of the arguments HUD makes for proposing these deferrals is HUD's contention that the PHAs are slow in spending previously appropriated CIAP funds. CLPHA's surveys, however, have shown that most CIAP projects are moving through the pipeline on schedule, and that PHAs usually spend at least 70% of the CIAP money they get within two years of the time it is made available to them by HUD. There are delays, but HUD has shown it knows how to handle these delays by setting deadlines for the expenditure of "old" CIAP funds, threatening the recapture of such funds, and permitting PHAs to keep them only if further extensions are truly justified. The Tables which HUD presents to the Congress usually show aggregated data as of September 30, the day in the modernization funding cycle when HUD has just obligated an entire new year's allocation of CIAP funds to PHAs. Consequently, a large proportion of these funds are not accessible to the PHAs through signed ACCs for months to come.

A much fairer way of looking at the expenditure rates for CIAP funds is by taking a particular year's appropriation and evaluating the rate at which these funds are spent. For example, FY82 CIAP funds should have been obligated by HUD by the Fall of 1982, and made available to the PHAs in the form of ACC's (or amendments) by February and March 1983. HUD's own figures show that approximately two and one half years later, by the end of September 1985, over 83% of FY82 CIAP funds had been spent by the PHAs. It is also likely that these percentages increased significantly by 12/31/85 because of PHA efforts to wrap up older CIAP project expenditures in response to pressure from the HUD Central Office in the midst of the threat of possible recaptures. For subsequent fiscal years the expenditure rates are likely to be even faster since both HUD and the PHAs are now accustomed to dealing with the CIAP program.

Table 1 below shows the PHA expenditures of CIAP funds for the first two years of the CIAP program, FY81 and FY82, as of 9/30/85.*

	As of 9/30/85			As of 12/31/85		
CIAP (in $ millions)	Obligated by HUD	Spent by PHAs	%	Obligated by HUD	Spent by PHAs	%
FY81	850.1	782.5	92.0			
FY82	725.7	607.4	83.7			

*Source: HUD Quarterly Reports on CIAP.

The modernization program is moving effectively, and should not be interrupted by a "pause" to wait a few months for the deferrals. This would only disrupt local PHA activities and exacerbate the types of problems HUD charges PHAs to make long-range plans to correct.

We would also like to ask the Committee to direct HUD to release all FY86 CIAP funds without changes in priorities, since it is too late to redesign the program priorities for FY86. In particular, HUD should not attempt to introduce a lead-paint hazard removal priority as a requirement of the FY86 CIAP program. For FY87, HUD should amend its budget request to include the first year of the amounts it now estimates will be needed to address this problem on a nation-wide basis over the next several years, a total which according to a recent study carried out for HUD could eventually reach nearly $1 billion.

3. Operating Subsidy.

CLPHA's estimates of the needs for operating subsidy in FY86 and FY87 are attached. I would like to bring two elements of these estimates especially to your attention.

(a) Proposed Freeze on PHA Allowable Expense Levels for FY87. We request that the Committee reject the proposed freeze on PHA Allowable Expense Levels proposed by HUD for FY87. PHA local wage rates are determined by agreements with our local unions and must be periodically re-negotiated, which often involves multi-year contracting. No PHA can unilaterally "freeze" wages. Capping the AEL, therefore, would force most PHAs to reduce further the number of their employees, having already had to do so for reasons I will reference next.

(b) Insurance. Mr. Chairman, insurance costs of the PHAs have escalated enormously since only one year ago. Many PHAs now suffer from substantial undercoverage. In addition, there are a growing number of PHAs that cannot obtain any coverage at any cost. For over 50 of these PHAs, HUD has signed waivers of its own regulations and instructed the PHAs to 'go bare' on insurance. We believe this is a less than responsible policy. What is going to happen to PHAs that go bare when they are hit with a $5 million personal injury suit, or if a child is hurt by an Authority-owned vehicle? Will HUD make up the difference? Will your Committee be willing to appropriate the funds at that time?

Those PHAs that are able to maintain adequate levels of insurance coverage can only do so by paying an increasing proportion of their operating budgets each year for this coverage. HUD will not now allow PHA budget adjustments to reflect actual premium increases. As a result, the PHAs' only alternative is to pay the price and take the money out of their ongoing maintenance and management activities. In Akron alone, we have experienced premium increases during the last year of $20,000, and expect a $75,000 increase for 1987. Consequently, I estimate that we have had to make reductions in our other areas of operation amounting to nearly $100,000 annually.

PHA budgets are creatures of the federal government. Our Allowable Expense Levels are set by HUD; our income is determined by HUD regulations; our operating subsidy is provided through HUD. When our actual costs increase more rapidly than the formula-specified inflation rates, these actual cost increases need to be recognized by the federal government and used to readjust funding levels accordingly. In FY86 alone, PHAs nationwide will probably spend $80 million more than allowed for under the HUD formula and this figure could easily exceed $100 million in FY87. We urge your Committee to provide adequate funding to cover this increased-annual level of insurance costs. PHAs are working together at this time in a variety of ways, with minimal help from HUD, to establish various forms of PHA insurance pools. Even these new approaches, however, are expected to cost more money than has been provided by the PFS formula in the past.

One possible way to make these budget adjustments for PHAs would be to take the reduction in utility outlays which has been achieved through falling fuel prices and CIAP energy conservation efforts, and earmark these savings for PHA budget adjustments where needed.

4. Sustaining The CIAP Concept.

CLPHA recognizes and applauds the achievements of the CIAP program, which in 1986 is now in its sixth year. The face of public housing in America has changed dramatically as a result of this program, and living conditions have improved for millions of Americans.

We urge your committee to continue to support CIAP at a level no lower than in prior years, until the results of the present nationwide survey of modernization needs in public housing become available.

Most CLPHA members recognize that the time will come in the future when the CIAP program will need to be changed. The number of public housing developments which now need "comprehensive modernization" is finite, and this number will decrease in the future as "comp mod" is completed at more and more developments. For a large and growing number of the approximately 10,000 public housing developments in the country, therefore, a new way will be needed for funding on-going capital improvements needs in the future. One way might be an annual replacement allowance. CLPHA has supported such an approach in the past in concept, provided first that adequate funds are made available to substantially reduce the already-existing backlog of "comp mod" needs. Then, the new replacement allowance program should be phased in gradually, as long as it does not divert "backlog" funds from those PHAs still struggling with old problems.

As an example of the unfinished agenda of the CIAP program as presently constituted, AMHA in a year-long study during 1985 documented $20 million worth of hard-core mod. needs that will need to be addressed within the next five years.

CLPHA believes that a two-pronged approach will be appropriate to initiate at some time within the foreseeable future, e.g. within five years. However, we also believe that the first step in moving in this direction should be to complete the Abt study of modernization needs in public housing, including that element of the study intended to calculate the rate at which such needs accrue annually. We hope that this study will provide a sound basis for designing future program directions.

We also urge your committee to continue its interest in the national modernization needs study. We know that future appropriations levels will not be based upon the study results alone, but if the study is done properly it may at least establish an objective basis for future debate. We urge Committee members to press HUD to release the study results without HUD policy recommendations and conclusions being incorporated into the study. Policy development should follow the release of the study and be based upon it. Further, policy should be developed in cooperation with the PHAs themselves. The most important thing now is for HUD to get the study completed quickly and professionally so that we can all see the results.

5. Impact of Reductions in Section 8 Program Funding.

Coupled with PHA concerns about the absence of funding to provide for the as-yet unhoused low-income population, is our concern that HUD's current budget proposal would have the effect of:

(A) causing PHAs to lose their ability to administer Section 8 programs because of their inability to maintain staffs because of the drastic reductions in administrative fees. Example: by 1987, Akron will suffer a deficit of $80,000 in fees.

(B) Restoring hundreds of thousands of Section 8 certificate-holders to the ranks of the homeless, because landlords will refuse to continue in the program due to the freezing of FMRs over a 2-year period. Over 1,000 of AMHA's certificate-holders are housed by eight landlords. (Only 2 of which would stand to lose a combined total of $87,252 annually.)

(C) the ending of hope for certificate-holders who are currently being turned away by landlords in anticipation of the rent freezes.

Attached are letters from the Mayor of the City of Akron, as well as 3 letters from Section 8 landlords, attesting to the gravity of the situation.

6. Services for the Elderly in Public Housing.

Finally, Mr. Chairman and members of the Committee, I would like to point out that housing for the needy is always "more than shelter," particularly for the elderly. As you know, the elderly population in this country is growing, both in absolute terms and as a proportion of the national population. This is also true in public housing. Households that moved into our elderly units at age sixty or seventy are now in their seventies, eighties, and in some cases even their nineties. Public Housing Authorities are being called upon to do more to help these households than ever before.

In Akron, of the 3,000 senior tenants, 594 are ages 80-89, and 107 are in the 90-100 year old range. We are doing the following things to assist our elderly. (1) Our human services counselor is available for an evaluation and referral service for all seniors, and works with approximately 100 agencies. (2) We are one of the 35-member Computerized Community Network which coordinates services for seniors so that they are not institutionalized for lack of concrete services. We have established a criteria for independent living to enable us to analyze the degree of the tenant's loss of the ability to live independently. We maintain in cooperation with the local pharmacy and Ohio State University a mobile pharmacy program for deinstitutionalized elderly to monitor by computer profile the avoidance of under- and over-medication, and we have eliminated hundreds of emergency hospital visits by virtue of this program. However, we see a major and growing need in the years ahead for congregate care, for alcoholism programming, and for mental health counseling services.

If we can do these things, it will help our elderly households to stay in place during the years when large moves can be traumatic to them, and avoid or at least minimize the number of moves they will have to make into nursing homes or other institutionalized settings. Providing these services to persons in elderly public housing can be one of the most cost effective approaches available for the expenditure of public funds for the elderly, and it also avoids the costlier and more personally debilitating approach of total institutionalization.

We recommend, therefore, that a way be found to provide funds within the HUD budget for increased services for the elderly in public housing.

Mr. Chairman and members of the Committee, today's headlines often make it seem that providing housing assistance to the poor, the needy, the elderly, the handicapped and others with special needs is an ineffective waste of the taxpayers' money. I believe instead that it is one of the most humane and direct ways in which a caring society can provide for the less fortunate among us. The other members of CLPHA and I call upon you to continue your Committee's commitment to public housing, and we again thank you for your support in the past and for inviting me to speak to you today.

Attachments:

A) CLPHA's specific funding request for each program.
B) Letters from Mayor of Akron and Section 8 landlords.

COUNCIL OF LARGE PUBLIC HOUSING AUTHORITIES

PUBLIC HOUSING CURRENT CONCERNS - APPROPRIATIONS, DEFERRALS AND BUDGET

Background

Public housing shelters 4 million of the nation's poorest families and elderly persons. Administered by over 3,200 local public housing authorities, its 1.4 million units, 45% of which are for the elderly, make up both the largest elderly and the largest family housing programs in the country.

Current eligibility for admission is 50% of local median income, with some exceptions; average income of the tenants is about $5,800/household.

Basic Appropriations Needs for FY87

1. Operating Subsidies of $1.48 Billion.

The Housing Act of 1937 limits rents to "ability to pay," increased in 1981 to 30% of adjusted income[1] and directs HUD to provide operating subsidies for the balance of operating expenses; these subsidies are based upon a regulatory formula known as the Performance Funding System (PFS), which is calculated on the costs of efficient performance. Rents cover only 55% of expenses for most large PHAs; operating subsidies are needed for the balance. PHAs have no other significant source of income.

Operating subsidies have increased on average only 2.5% per year from FY81 through FY85. Additional funds are needed in FY87 over inflation to meet drastic increases in insurance premiums for liability and casualty insurance. Congress must specially provide these funds because HUD has refused to reflect them in the PFS formula. (HUD's FY86 Budget would only fund 88% of the amount required by the Performance Funding System, let alone ignore the $80 to $100 million in increased premiums.)

Attached hereto as Appendix A is a detailed accounting of FY87 operating subsidy needs.

2. Comprehensive Improvement Assistance Program (also known as CIAP or "modernization") of $1.6 Billion Minimum but $2.5 Billion Needed.

CIAP funds are essential to protect the $70 billion public housing stock, restore vacancies to occupancy and give tenants minimally decent shelter. Many public housing projects were erected in the '40s and '50s and are deteriorated, obsolete and excessively dense by current standards. CIAP is the only source of capital funds to correct these conditions. The backlog need is unofficially estimated to be at least $10 billion ($20 billion in budget authority under current financing methods). In recent years, appropriations have averaged $1.75 billion, flattening to $1.5 billion in FY85. A "current services" level would be about $1.6 billion.

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[1] 24.8% of income is what unsubsidized purchasers pay to buy median price existing housing, as of January 1986, according to the National Association of Realtors; such persons' net housing costs are really a lower percentage of income when income tax deductions for mortgage interest and taxes are reflected.

The results of a Congressionally-mandated study of the total costs of modernizing the public housing stock should be released by mid-year. Undoubtedly, it will show that the current level of appropriations for CIAP is inadequate for meaningful progress. CLPHA urges that Congress begin in FY87 to build to the needed level, by providing $2.5 billion in appropriations (the level of FY83); even at the cost of reducing the development program somewhat.

The 1986 Appropriations Act allowed up to 20% of the development funds to be used for reconstruction of obsolete projects.

Since public housing development has been cut to a trickle, focus should be on preserving and restoring what's there.

(HUD officials disingenuously contend there is a backlog of CIAP monies unspent by PHAs; not so; most of the funds referred to by HUD are recent appropriations, either not allocated or allocated late to PHAs. For example, HUD has not even started the application process for FY86 funds; funds for all prior years were not provided until the end of the fiscal year and then, because of processing requirements, 2 to 3 years ensue before actual work in in place. Last year HUD recaptured only $11.2 million from PHAs of so-called unused mod funds out of more than $6 billion in appropriations and one-half of it came from one PHA.)

3. Development of 5,000 Units.

Demand for public housing is at a record high. Waiting lists now frequently equal or exceed the total number of an authority's units; for the elderly, the waiting period usually exceeds their life expectancy.

The FY86 Appropriations Act allows for new construction or substantial rehabilitation of 5,000 additional public housing units, a pittance compared to the pre-Reagan level of 25,000 to 35,000 units; also, as noted above, up to 20% of these funds are available for reconstruction of existing obsolete projects, too costly for the use of CIAP funds. In addition to current demand, these development monies are needed to replace high-rise buildings with less dense low-rise structures and units removed from the stock by sale to tenants or otherwise.

We urge continuation of approximately the same program level and emphasis, with the shift of some funds to augment CIAP.

Rejection of Proposed FY86 Rescissions and Deferrals

The Reagan budget proposes over $9 billion in rescissions of which over half are at HUD. The major rescission would greatly reduce and recast the 97,000 assisted housing units provided by the Congress in the FY86 Appropriations Act; those appropriations, just enacted November 25, 1985, were provided only after considerable cuts in the process of adoption - to say nothing of the 66% cut in budget authority for assisted housing since 1981.

The rescission would eliminate approximately $4 billion in budget authority for assisted housing and an estimated 47,000 units of conventional public housing, 202 housing for the elderly and Section 8 Existing and Moderate Rehab and approximately $800 million in CIAP. The Administration proposal would transform the FY86 program - and the nation's housing efforts - into 50,000 short-term housing vouchers. Vouchers, as you probably know, is still considered by Congress to be an experimental, not an established program; no results of the experiment have yet been provided by HUD.

In addition, over $2.4 billion would be deferred into FY86, including $225 million of CIAP funds, with the aim of avoiding any FY87 appropriations for assisted housing.

The impact of these actions for public housing would be the elimination of modernization activities in FY86 and FY87, with funding only for emergency repairs up to $225 million in each year and total elimination of the development program.

The Urgent Supplemental Appropriations bill, H.R. 4515, formerly designated H.R. 4380, Report No. 99-510, contains a rejection of these deferrals, at the recommendation of the House Appropriations Subcommittee on HUD-Independent Agencies. We strongly urge your support for this action in the House, and, in due course, in the Senate

The rescissions, unless approved by Congress in the meantime, will expire on or about April 15.

Senate FY87 Budget Resolution

The FY87 Budget Resolution as reported out by the Senate Budget Committee provides: (a) a "discretionary freeze" for the operating subsidy at the FY86 level of $1.360 billion; (b) a freeze of the CIAP or modernization funding at the FY86 post-sequester level to be funded by capital grants; capital grants involve approximately half the budget authority as do the present systems of tax-exempt or Treasury borrowing for the same program level, so that the Senate Budget resolution calls for a $705 million capital grant for CIAP, which is equivalent in the program activity to the FY86 $1.45 billion post-sequester appropriations; (c) the overall assisted housing account - public housing development, existing and moderate rehab Section 8, 202 for the elderly and vouchers - would be reduced by 25%, with a hold harmless for the 202 elderly program at the current unit level.

The House Budget Committee is expected to provide a current services level for the assisted housing programs, which is the position that CLPHA urges.

General Comment

No programs in the American budget have been cut so severely since 1981 as assisted housing - almost two-thirds and, were the rescissions and deferrals approved, over 90%.

Almost as devastating, the Administration has assaulted public housing and companion programs through hostile regulation, funding delays and illegal procedures, as well as attempting to replace workable and acceptable programs, such as the Section 8 Existing and Moderate Rehab program, with untested and undesired efforts, such as the voucher.

The oft heard "everyone has to bear his share of the cuts" is too simple a reading. In making cuts, the experience of programs since 1981 should be considered.

CLPHA urges Congress to preserve the public investment in decent shelter by rejecting the Administration's "savings" as too costly in human and financial terms.

CLPHA FY87 Recommended Operating Subsidy Calculated on HUD Data

Basic PFS Requirements for FY87

°Basic PFS, plus subsidies for non-PFS authorities,* plus additional income from increase in rent/income ratio (OBRA '81) and from changed adjustments to income (HU-R RA '83), plus savings from vacancy rule implementation. This is HUD's calculation; CLPHA accepts it.	$1,440.9 million
°Savings from rolling base for utilities (i.e. reduction in energy costs due to conservation produced by modernization**; HUD's figure is $68.8; the FY86 estimate is $37.5 million):	-41.0 million
	$1.400.0 billion
Insurance premium shortfall*** (i.e. the estimated extra costs above those in the PFS formula; extensive back-up data for this estimate is available from CLPHA:	+80.0 million
CLPHA estimate of FY87 Operating Subsidy Need:	$1.480.0 billion
Appropriation Needed:	
FY87 Need	$1,480.0 million
Carryover from FY86 (Estimated)	61.0 million
New Appropriation of: (Payments for the Operation of Low-Income Housing Projects)	$1.419.0 billion

[NOT INCLUDED: $20 to $30 million in recaptured operating subsidies which HUD may be required to disgorge as a result of litigation pending against HUD, in which CLPHA and 22 housing authorities are plaintiffs.]

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* There are 13 PHAs, not on the U.S. mainland, whose operating subsidies are determined by budget review rather than the PFS.

** A SUCCESS STORY: HUD estimates that as a result of CIAP modernizations, started by PHAs in FY82, utilitity expenses will be $133 million lower in FY86 than otherwise would have been projected! These savings will continue to mount as CIAP work continues.

***These funds must be earmarked in the appropriations bill or HUD directed to adjust PFS formula to reflect this change in the operating costs of public housing.

LETTER FROM THOMAS C. SAWYER, MAYOR OF AKRON, OH

April 23, 1986

Mrs. Janet Purnell, Executive Director
Akron Metropolitan Housing Authority
180 West Cedar Street
Akron, Ohio 44307

Subject: Impact of Federal Budget Cuts for Subsidized Housing

Dear Mrs. Purnell:

Proposed federal budget cuts for assisted housing will produce severe consequences far beyond the direct impact on the quality of life for tenants of the Akron Metropolitan Housing Authority (AMHA). These reductions threaten the enviable quality of AMHA housing developments and will create a ripple effect throughout Akron's neighborhoods. These housing projects and senior citizen highrises are scattered throughout the City and fully integrated into the residential fabric of our city. As the ability of the AMHA to maintain these properties decreases, their inevitable and observable deterioration will put at risk the substantial social and financial investments of surrounding owner-occupied properties.

Of equal concern to us is the proposed changes to the Section 8 existing housing program. One of the most serious problems facing America's cities is the maintenance of the private rental housing stock. The high number of units in Akron participating in the Section 8 program attests to the success of this program in providing private landlords with sufficient income to maintain their properties with a reasonable return on their investment. As their financial capability diminishes, the neglected or deferred maintenance of these scattered site properties will weaken the willingness of their owner-occupied neighbors to improve their property or even remain in their neighborhood.

Since the inception of the Community Development Program, Akron has waged an aggressive and successful effort to rehabilitate low- and moderate-income neighborhoods. Our own ability to do so is being severely curtailed by the deep reductions in Community Development Block Grant funding. We now receive aproximately 50% of the CDBG allocation the City received in 1980. We are fully cognizant of the fact that the majority of Akron's low- and moderate-income population resides in private housing. We are committed to reducing the administrative costs of these programs so as to maintain as near as possible the same level of services and benefits to homeowners and investor owners. To suggest that the City should assume the added responsibility of assisting the maintenance of federally subsidized housing is folly. Although the City has assisted the rehabilitation of thousands of owner-occupied housing units, many times that number still remain to be improved. I believe it is critically important to keep faith with and continue to provide significant benefits to our City's homeowners who have contributed so much in terms of tax dollars and investment in their property. To both decrease the amount of CDBG funds available for housing rehabilitation and, at the same time, add on an additional supply of housing with a claim on these funds will only further dilute their effectiveness.

I wish you good fortune for your Congressional testimony and hope that this information is helpful.

Sincerely,

Thomas C Sawyer

THOMAS C. SAWYER
Mayor

FACT SHEET

Akron Rental Housing Units		35,141
Subsidized Housing Units		6,300+ (18%)
Community Development Block Grant		\$10.979 million (1980) 5.306 million (1986)
Rental Rehabilitation	1984	\$245,000 (49 rental subsidies)
	1985	\$241,000 (48 rental subsidies)

Housing Rehabilitation Programs

Neighborhoods - 14
Houses Rehabilitated - 6,700
Loans and Grants - \$28 million
65% of CDBG directed to low and moderate neighborhood improvement

Housing Assistance Plan

Unmet need for rental subsidy - 9,824 households

LETTER FROM RANDALL K. DAVIS, FIELD DIRECTOR, APARTMENT DIVISION, FOREST CITY MANAGEMENT, INC.

April 18, 1986

Mrs. Eula T. Powers, Manager
Section 8 Division
Akron Metropolitan Housing Authority
414 Pine Street
Akron, Ohio 44307

Dear Mrs. Powers:

As you know, Chapel Hill Towers has been involved in the Section 8 program under the direction of Akron Metropolitan Housing Authority for the last 9 years. Up until about a year ago we have enjoyed working with the program and helping out in providing housing for low income people.

About a year ago, somebody took it upon themselves to determine what Fair Market Rent was to be. This eliminated us from any rent increases for 1985. We are now approaching the fifth month of 1986 and the Fair Market Rent has not been adjusted to the economic realities of this area. It is also my understanding that forces are underway to cap the F M R and also to freeze the annual adjustment factor. As you probably know, property taxes on multi-family dwellings doubled last year. This property tax increase alone resulted in a $14.00 per month increase for each apartment.

You currently have 78 units under lease with us. We are, at the present time, losing $2,021.00 per month on these 78 units. This breaks down to $25.91 per month loss on each apartment.

It is my feeling that if only a minimal loss were incurred, Ownership would be able to go along as a matter of investment in providing quality housing for low income people. We are, however, not talking about minimal loss, we are talking about losing, this year, $24,252.00 by participating in the Section 8 program. This is almost more of a burden than management can conscientiously ask ownership to endure.

For the last 6 months we have taken no new Section8 applicants, not because we don't want to, but because we cannot afford to. I am not even sure that we can wait for normal attrition to diminish the present number of participants.

At Chapel Hill Towers we have 404 units. Last year our vacancy rate was 2.36%. As you can see we do not need the Section 8 program to keep our units full at Chapel Hill Towers.

When this program was initiated by the Federal Government, it was done to fill a need, and that need still exists. When Chapel Hill Towers entered into the Section 8 program they did so to be part of this noble effort and we would like to be able to continue.

One of my great concerns is that if present trends continue, low income people will no longer be able to receive quality housing. You, as a manager of the Section 8 program, will no longer be dealing with landlords with finding housing for your people but you will be dealing with slumlords. It is my firm conviction that the Section 8 program that deals with private landlords is the most cost effective housing program that the Federal Government has in place. It is also my firm conviction that if present trends continue, this program will become non-existant.

Best wishes for our continued cooperation.

Sincerely,

Randall K Davis

Randall K. Davis
Field Director

LETTER FROM SCOTT B. GROSS, VICE PRESIDENT, CASTLE APARTMENTS, INC.

April 21, 1986

Mrs. Janet Purnell
Executive Director
Akron Metropolitan Housing Authority
414 Pine Street
Akron, Ohio 44307

Dear Mrs. Purnell:

It is with alarm that I write you regarding the proposed budget cuts in The 1987 Low Income Housing Budget that is presently being discussed in Washington.

We have been involved in the housing industry for well over 35 years, and we have always prided ourself in providing decent, safe, and sanitary housing throughout the Greater Akron Community. More specifically, we have entered into many contractual agreements with the Housing Authority under the Section 8 Certificate Program, Mod Rehabilitation Section 8 Program, and in addition to the Section Eight Substantial Rehabilitation directly with HUD, and the Rental Rehabilitation Voucher Section 8 Program that is administered by the State of Ohio. Each item has an effect either directly or indirectly on our organization; however, the Community Block Program and the Farmers Home administration Programs cannot be addressed since, our experience has been limited in these areas; however, I would like to comment on each of the following proposed cuts.

1. FREEZING SECTION 8 FAIR MARKET RENTS:

Whereas, our economy is not presently expanding at an inflationary rate, the housing industry has seen increases in the cost of materials and supplies which effect our bottom line. This economic negative growth appears to be temporary; however, our industry is readying itself for a major operational cost increase within the next 16 months. As the housing stock grows older, it requires more funds to effect the necessary repairs, in addition to funding the necessary capital improvements. So how would it be possible to provide for these, if our rent levels are capped?

2. CERTIFICATE AND VOUCHER CUTBACKS:

   The end of the Section 8 Certificate Program seems shortsighted since, it would be tough to entice any landlord to expend his time,and effort dealing with the bureaucratic red tape in the administration process for only a one year period which it appears is the length of the typical "Voucher" Program.

   As our region of the country is experiencing further plant closings, more people are being placed on the welfare rolls, in addition to increasing the substantial housing waiting list without any relief. Their ranks shall certainly swell, creating a housing shortage as we have not seen before for these individuals.

3. REHABILITATION GRANT CUTS:

   One of the ways to revitalize the neglected areas of the community and to provide the necessary subsidized housing that is needed ,would be the continuation of the Moderate Rehabilitation Section - 8 - Programs, which have worked well in the past. It should be noted, that freezing the fair market rents, or not allowing the annual adjustments, would retard any new or rehabilitated units under these programs, since a developer operating under good faith, would have the door closed on him as to his ability to receive the necessary operating revenue in the future.

In closing, I appreciate the opportunity to express our concern in these matters, and know if we all communicate on an open forum, we will be able to address this problem, and arrive at a much needed solution.

Sincerely,

CASTLE APARTMENTS, INC.

Scott B. Gross
Vice President

SPECIAL NOTE: CASTLE APARTMENTS INC. HAS 202 UNITS UNDER THE SECTION EIGHT EXISTING PROGRAM AND WOULD RISK A LOSS OF NEARLY $63,000 ANNUALLY.

STATEMENT OF JOHN DENNING, VICE PRESIDENT AND PRESIDENT-ELECT, AMERICAN ASSOCIATION OF RETIRED PERSONS

Senator GARN. Is Mr. John Denning here? Mr. John Denning, vice president and president-elect of the American Association of Retired Persons.

Mr. DENNING. Thank you, Mr. Chairman.

I am John Denning, vice president and president-elect of the American Association of Retired Persons. On behalf of our association, I thank you for the opportunity to express the association's views regarding Federal appropriations for HUD and the Independent Agencies. I will summarize my remarks and ask that our full statement be included in the record.

Senator GARN. It will be.

FEDERAL HOUSING POLICY

Mr. DENNING. Today, the Federal housing policy is at a crossroads. The administration has called for the complete elimination of all traditional housing assistance programs, leaving only vouchers to serve low-income Americans. This change would not wait for fiscal year 1987, but is proposed to commence now, contrary to the decisions carefully deliberated by your committee and the Congress last year. Such action would deliver the coup de grace to programs that have already undergone reductions in excess of 60 percent over the past 5 years.

The implementation of administration policy would have the most severe consequences for the least mobile and most vulnerable consumers in the housing market—low-income elderly and handicapped persons. In the wake of publication of the President's budget, AARP has received numerous calls and letters from alarmed seniors—usually from elderly women, living alone—who fear that they will either lose the housing assistance on which they rely, or be foreclosed from access to aid for which they have long been waiting.

With rents increasing, affordable units disappearing from the market, and functional impairments making self-sufficiency more difficult, older people look to the public sector for some minimal support in maintaining their independence. For instance, an AARP member from California write:

> I have a forced move in a few months because the old house I rent from a mobile park for 12 years now is to be demolished to enlarge the park for spaces. I am frightened as rents have gone beyond my reach. I am 86 years old and living on SSI and social security. The amount is $535 a month, and I am alone—no son or daughter. I am determined to stay out of the board and care places for the aged.

POLICY RECOMMENDATIONS

The members of this subcommittee, Mr. Chairman, have consistently supported a strong Federal role in the provision of low-income housing assistance, especially for vulnerable populations, such as the elderly and the handicapped. The association appreciates this support and strongly urges that the subcommittee maintain this posture. Specifically, we ask that following policy recommendations be adopted:

One. Overturn the administration's housing deferrals for fiscal year 1986. Deferral of $2.3 billion in HUD housing assistance would adversely affect key program serving older Americans, especially section 202/8 rental assistance. Deferral of borrowing authorities for the section 202 revolving loan fund threatens to disrupt the program.

Two. Approve no less than the fiscal year 1986 appropriations level for all HUD housing and community development programs in fiscal year 1987.

The need for a strong Federal role in housing development and assistance continues to be compelling. This is no time to reduce the Federal commitment even further.

Three. Fund the section 202 housing for the elderly and handicapped program at levels sufficient to support 12,000 new units. Low-income, older and disabled persons are hard put to find or even seek units that offer specialized design and supportive services in the private market. The section 202 program has produced this kind of housing with unparalleled success.

Four. Continue funding of the Congregate Housing Services Program, commonly called, CHSP. Of the 62 projects now funded under CHSP, 33 will be forced to close if no additional money is provided in fiscal year 1987. This program should be continued permanently.

Five. Maintain full operating and modernization subsidies in public housing and full adjustments should be provided for section 8 fair market rents.

Six. The voucher program should be thoroughly evaluated before it is expanded further.

SENIOR ENVIRONMENTAL EMPLOYMENT PROGRAM

In another area, the association supports the Senior Environmental Employment Program. We urge the subcommittee to approve report language encouraging EPA to make greater use of the senior environmental employment enrollees. The subcommittee approved this language for the fiscal year 1986 funding bill. We affirm our support for similar language in the fiscal year 1987 appropriation measure.

Presently, about 2,250 older workers are employed by the EPA under the SEE program. In fiscal year 1987, the number of participants could be double, thereby contributing to substantially to the quality of our environment at a very low cost.

In conclusion, AARP recognizes that high, sustained deficits and the impending threat of spending reductions under Gramm-Rudman-Hollings law places tremendous pressure on Congress this year, and that is why the association supports development of a fair and sound Federal budget.

However, to cut housing assistance further would be neither fair nor ultimately cost efficient since basic housing needs left unattended will only grow and will be reflected in crisis spending for both housing and health care in the not too distant future. We urge the subcommittee instead to plan, and spend sensibly now.

Thank you for this opportunity.

Senator GARN. Thank you very much, Mr. Denning. We appreciate your being here today.

[The statement follows:]

STATEMENT OF JOHN DENNING, PRESIDENT-ELECT, AMERICAN ASSOCIATION OF RETIRED PERSONS

On behalf of the American Association of Retired Persons, a membership organization numbering over 22 million, thank you for this opportunity to express the Association's views regarding federal appropriations for the Department of Housing and Urban Development (HUD) and the Independent Agencies. Our recommendations focus primarily on housing programs serving older Americans, and can be summarized as follows:

Re: HUD

1) Overturn completely Administration deferrals of FY 1986 housing appropriations.

2) Approve FY 1987 appropriations for housing and community development at no less than levels appropriated for FY 1986.

3) Provide sufficient funding for Section 202 Housing for the Elderly and Handicapped to support 1200 new units. Include report language emphasizing awards to minority sponsors.

4) Continue funding of the Congregate Housing Services Program.

5) Maintain full operating and modernization subsidies in public housing and provide full adjustments in Section 8 Fair Market Rents.

6) Require complete evaluation of the Voucher Program before expanding it further.

Re: Environmental Protection Agency (EPA)

1) Approve report language to encourage and expand use of greater use of Senior Enviornmental Employment program participants by the EPA.

Federal housing policy is at a crossroads. The Administration has called for the complete elimination of all traditional housing assistance programs, leaving only vouchers to serve low income Americans now and in the future. This change would not wait for FY 1987, but is proposed to commence now, abrogating decisions carefully deliberated by your Subcommittee and the Congress last year. Such action would deliver the coup de grace to programs that have already undergone reductions in excess of 60 percent over the past five years.

The implementation of Administration policy would have the most severe consequences for the least mobile and most vulnerable consumers in the housing market: low income elderly and handicapped persons. In the wake of publication of the President's budget, AARP has received numerous calls and letters from alarmed seniors -- usually elderly women living alone -- who fear that they will either lose the housing assistance on which they rely, or be foreclosed from access to aid for which they have long been waiting. With rent burdens demonstrably increasing, affordable units disappearing from the market, and functional impairments making self-sufficiency more difficult, older people look to the public sector for some minimal support in maintaining their independence. The case is poignantly illustrated by letters like the following:

> (from a member in California)
>
> "I have a forced move in a few months because the old house I rent from a mobile park (for 12 years now) is to be demolished to enlarge the park for spaces. I'm frightened as rents have gone beyond my reach. I am 86 and living on SSI and social

> security. I am alone -- no son or daughter. The yearly amount (sic) is $535 a month. I am determined to stay out of the board and care places for the aged . . . Hoping for any information you can send to me."
>
> (from a member in New York)
>
> I have my name on a couple of waiting lists in Massachusetts because that's where my family lives. I thought it might be nice as long as I was a widower and alone except for my son who lives in Massachusetts. Now the question is this (sic). Now that our Administration is making drastic cuts in spending (one of which is supposed to be on housing) is it safe for an older person to give up his home and move into these housing groups? If I moved in and they made their drastic cut, where would I stand?"

The Association supports the Senate Budget Committee's proposed FY 1987 Budget Resolution that implicitly rejected the dismantling of federal housing programs. Likewise, we were heartened by Congress' unwillingness to enact proposed rescissions of FY 1986 housing appropriations. The members of this Subcommittee, Mr. Chairman, have consistently supported a strong federal role in the provision of low income housing assistance -- especially for vulnerable populations such as the elderly and handicapped. The Association appreciates this support and strongly urges that the Subcommittee maintain this posture. Specifically, we ask that the following policy recommendations be adopted:

1) Overturn the Administration's housing deferrals for FY 1986. Deferral of $2.3 billion in housing assistance would have a severe impact on a number of key housing programs serving older Americans, especially Section 202/8 Rental Assistance. Congress should act to overturn these deferrals, attaching to such action report language specifically disapproving the Office of Management and Budget's (OMB) request to lower the Section 202 loan limitation which controls new Section 202 activity. At the same time, the Administration's $599 million deferral of permanent Treasury borrowing authority for the Section 202 revolving loan fund should be specifically reversed.

2) Approve no less than the FY 1986 appropriations level for all HUD housing and community development programs in FY 1987. The need for a strong federal role in housing development and assistance continues to be compelling. The private sector has not produced enough affordable housing for low income persons, especially units designed to enable older persons and those with disabilities to function as independently as possible. As noted, rent burdens are increasing, the stock of low income housing is dwindling, and a recent survey of the nation's mayors indicates that these trends are contributing to the serious problem of homelessness across the country. At the very least, the current appropriation for housing and community development programs should be maintained in FY 1987.

3) Fund the Section 202 Housing for the Elderly and Handicapped Program at levels sufficient to support 12,000 new units. There is a high and growing demand for specially designed housing with a supportive environment and appropriate services -- housing that the Section 202 program has produced with unparalleled success. Low income older and disabled persons are hard put to find -- or even seek -- unsubsidized units that offer (among other features) lowered counter-tops, non-slip floors, grab bars, extra-wide doorways, and the nutrition and transportation services that allow them to maintain the fullest measure of independence and security. Waiting lists for existing Section 202 facilities are frequently closed, with a one-to-five year wait for those who are on them. Moreover, older persons in Sections 8, 236, and 221(d)(3) facilities that are now reaching loan term are at risk of displacement, yet few affordable and

appropriate settings await them in their communities. A rapidly aging American population ensures that the need for Section 202 units and similar alternatives will continue to increase. Beyond the advantages to residents of a less restrictive environment, congregate housing clearly avoids the heavy costs to taxpayers imposed by inappropriate institutionalization.

The Association urges that report language once again be approved that emphasizes the awarding of Section 202 fund reservations to minority sponsors. Increased minority sponsorship has been directly responsible for an increased number of minority elders served, and elevated rates of poverty among older minority persons strongly argue for continuation of this policy.

In addition, the Association is concerned about HUD's overly strict implementation of the "very low income occupancy", or "targeting" requirement. HUD's administration of this requirement is contrary to Congressional intent and adversely affects both sponsors and consumers of the Section 202 programs. We are aware that the Chairman and the full Committee have taken an interest in this issue in the past, expressing the need for a change in the method of administering the requirement, and that HUD has failed to heed such sentiment. The Association therefore urges the Committee to include statutory language in the FY 1987 Appropriations to resolve this issue.

4) Continue funding of the Congregate Housing Services Program (CHSP). The CHSP provides more comprehensive services in Section 202 and public housing for the elderly, including, among others, meals, personal care, housekeeping and home health services, shopping and escort services, and case management. Congregate services promote socialization, reduce isolation, and contribute to the improved health and well-being of assisted residents. As older persons age in place, these services become increasingly important.

Of the 62 projects now funded under CHSP, 33 will be forced to close if no additional monies are provided in FY 1987. All but a few of the remainder would run out of funds in FY 1988. AARP believes this program should be continued permanently and expanded as soon as possible.

5) Maintain full operating and modernization subsidies in public housing; provide full adjustments in Section 8 Fair Market Rents (FMRs). Units constructed through public housing and the Section 8 program house the vast majority of assisted elderly households. Forty-two percent of all public housing units are occupied by at least one individual over age 62. Administration proposals to freeze subsidies for ongoing upkeep and to reduce funds for modernizing these units thus jeopardize the living conditions of a substantial number of vulnerable elderly citizens. Proposals to freeze FMR's pose a similar threat to residents of Section 8-assisted facilities, where owners will be forced to respond to reduced resources by cutting back on maintenance. This should not be allowed to happen. Also, since Fair Market Rents dictate future rental revenues available to pay off the loan and operate the project, artificially low FMRs produce stripped-down facilities of substantially reduced quality.

6. Evaluate the voucher program before funding any further expansion. Despite Administration proposals to replace all existing housing programs with vouchers, serious doubts remain as to the adequacy of such an approach in meeting the needs of low income persons, especially those -- like the elderly and handicapped -- who are less mobile and who require special features and services in housing. A thorough evaluation of vouchers has yet to be made and offered for comment, action which is essential before further expansion of the program takes place.

Senior Environmental Employment Program

The Association urges the Subcommittee to approve report language to encourage the Environmental Protection Agency (EPA) component units to make greater use of Senior Environmental Employment enrollees in improving our environment. The Senate HUD-Independent Agencies Appropriations Subcommittee approved this language for the Fiscal Year 1986 funding bill. We affirm our support for similar language in the FY 87 appropriations measure.

The Gramm-Rudman-Hollings balanced budget amendment has forced government agencies to economize and to search for innovative approaches to maintain services with less funds. The use of older workers has proved to be a cost effective means to control environmental pollution. Otherwise, EPA would be required to hire consultants who would be paid substantially more than SEE enrollees. Presently, approximately 2,250 older workers are employed by the EPA under the SEE program. It is estimated that in FY 1987 the number of participants could be doubled, thereby contributing substantially to the quality of our environment at very little cost.

SEE is a program that enjoys strong bipartisan support, in large part because it is a "win-win" proposition. SEE not only provides crucial services to improve the environment in localities throughout the country, but it also enables older Americans to help themselves while engaging in fulfilling activities by helping others in their communities.

The report language could help to expand the role for SEE enrollees to assist EPA component units, including complying with recent regulations for ground water, water supply monitoring, acid rain inventories, hazardous materials routing survey, water quality sampling and monitoring, and pesticide inventory and control. Additionally, the language could promote the establishment of state environmental assistance projects. Moreover, report language would make it possible for EPA to assist state and federal facilities in meeting the National Environmental Policy Act mandates.

EPA's environmental projects frequently lend themselves to the hiring of older Americans because the tasks are typically short-term and temporary in nature. One noteworthy example is the asbestos in school control program. SEE enrollees have distinguished themselves in identifying asbestos in our school systems throughout our nation, and assisting in its removal to assure a safer and healthier environment for children.

SEE has proved to be an extraordinarily successful program time and time again. EPA should be encouraged to make greater use of this economical and effective program.

CONCLUSION

AARP recognizes that high, sustained deficits and the impending threat of spending reductions under the Gramm-Rudman law place tremendous pressure on Congress this year. That is why the Association supports development of a fair and sound federal budget. To cut housing assistance further, however, would be neither fair nor, ultimately, cost-efficient, since basic housing needs left unattended will only grow and will be reflected in crisis spending for both housing and health care in the not-too-distant future. We urge the Subcommittee instead to plan, and spend, sensibly now.

STATEMENT OF DAN LEWIS, EXECUTIVE STAFF ASSISTANT, NAVAJO TRIBAL COUNCIL, ON BEHALF OF THE AMERICAN INDIAN HOUSING COUNCIL

INDIAN HOUSING PROGRAMS

Senator GARN. Is Mr. Dan Lewis here?

Mr. Lewis, while you are coming up, I would explain that Mr. Allen English was to join you, but I understand that the airlines have struck once again, his bags didn't arrive, his testimony is in his bag. When his bags do arrive, we will be happy to include his testimony in full in the record. If you would like to proceed.

Mr. LEWIS. Thank you, Mr. Chairman, for this opportunity to testify this morning.

My name is Dan Lewis, and I am executive staff assistant to the chairman of the Navajo Tribal Council. On behalf of Chairman Zah, I want to thank you for this opportunity to briefly present our views on Indian housing programs.

As others have mentioned already, the deferral also affects Indian housing. With the few thousand units that were appropriated last year—1,921 after Gramm-Rudman—this severely affects those Indians in need of housing. There is an estimated need of over 90,000 units of new housing out in Indian country. So this severely impairs those people who seek housing and are in desperate need.

We request that this committee oppose that deferral on HUD assisted housing.

Second, with respect to the appropriation, from 1981 through 1986, Congress has averaged around 2,000 units per year. We request that the committee appropriate at least 2,000 for Indian tribes around this Nation. There is a need, as I mentioned before, of 90,000, 30,000 alone for the Navajo Nation, which covers an area greater than the size of West Virginia and extends into the States of Arizona, New Mexico, and Utah. There is a tremendous need on our reservation, as well as Mr. English will point out in his testimony to be submitted later to the committee.

The President recommends zero new housing units for Indian country, and instead suggests to Indian country to use the section 8 voucher program. The voucher program depends on existing housing stocks, and there is no existing housing stocks out in Indian Country.

So as admitted by Assistant Secretary Baugh to the Select Committee on Indian Affairs, and in an article in the Washington Post, he admits that vouchers do not work on Indian reservations. So this leaves us with only other alternative, which is the Bureau of Indian Affairs Housing Improvement Program. But this program is primarily concerned with the rehabilitation, not the construction of new units.

RECAPTURE AND REUSE

Finally, I would like to share one final issue that I have been asked to comment on, and that is the issue of recapture and reuse.

HUD has recently issued or said that they will accelerate a policy to recapture housing units that are in the pipeline. Tribes have been receiving figures from 1,700 to 2,000, but have really received no criteria as to how this recapture policy is going to take place and what projects are up for recapture.

What happens when units are recaptured: the funds are simply returned to the Treasury, and cannot be used again by Indian tribes. What tribes are recommending is not for a rejection of the recapture policy. We feel that if the units cannot sufficiently progress through the pipeline they should be recaptured, but instead of returning the money to the Treasury, they should be allowed to use it on other Indian reservations where there is a need for housing where they can get it through the pipeline.

So we would ask that this committee take into serious consideration a recapture and reuse legislation for Indian Housing. As I mentioned before, others would point out as well, this may be a special case for Indian tribes, but it isn't because we have no other alternatives, as I pointed out, the voucher program cannot work on Indian reservations.

So we would ask for your consideration of recapture and reuse authority out on Indian reservations for the Indian housing program.

Thank you for this time to testify.

Senator GARN. Thank you, Mr. Lewis. Your full statement will be included in the record.

[The statement follows:]

STATEMENT OF DAN LEWIS, EXECUTIVE STAFF ASSISTANT TO THE CHAIRMAN OF THE NAVAJO TRIBAL COUNCIL

My name is Dan Lewis. I am Executive Staff Assistant to the Chairman of the Navajo Tribal Council. On behalf of Chairman Peterson Zah, I want to thank the Committee for this opportunity to briefly present our views on the FY' 87 HUD Appropriations and the issues of recapture and reuse authority for HUD's Indian housing program.

I. FY' 87 HUD Indian Housing Program

Despite the estimated need in Indian country for 90,000 new housing units, the Administration has once again proposed to zero out all new construction activity in the HUD Indian housing program. The HUD Indian Housing program, however, is the primary source of new housing.

What about the Bureau of Indian Affair's Housing Improvement Program?

> The Bureau of Indian Affairs' Housing Improvement Program (HIP) is primarily designed to rehabilitate the existing housing stock. The administration proposes a 28% cut in the HIP program for FY' 1987.

What about the Administration's Voucher Program?

> The 1987 Administration budget proposes a total of 50,000 new voucher units in FY'87. The total would be split: 25,000 for urban areas and 25,000 for rural areas. According to the HUD budget "the section 8 voucher program is expected to provide more cost efficient assistance." However, on February 8, 1986 an article in the Washington Post quoted James E. Baugh, Deputy Assistant Secretary for Public and Indian Housing, acknowledging that, "In tight markets...you obviously have a problem. [Vouchers] don't work at all on an Indian reservation'."

For the past two years, the Congress has responded to the Administration's zero option by allocating an average of 2,000 units. The Navajo Nation respectfully requests that this Subcommittee appropriate at least 2000 units for FY'87.

II. Recapture/Reuse

I would also like to share with this Subcommittee two concerns the Navajo Nation has regarding the issues of recapture and reuse.

During the past few months, HUD has expressed their intention to start recapturing Indian housing units that are "in the pipeline." Tribes and their representatives have been receiving conflicting reports as to the number of units subject to recapture. Figures between 1700 and 2000 have been discussed. Moreover, HUD has not stated what housing projects are in jeopardy nor have they provided the criteria for recapture. Until these questions can be answered, the Navajo Nation respectfully requests that this committee oppose any immediate plans by HUD to recapture Indian housing units.

The Navajo Nation would also like this committee to consider legislation that would permit recaptured units to be reused within Indian country. Under current regulations funds from recaptured units are returned to the Treasury. But given the desperate housing situation throughout Indian country, and the small number of units that are available each year to tribes, does'nt it make better sense to take the units that one tribe cannot use and give it to another tribe which can put those units under construction? And which policy makes the positive step toward providing relief to Indian families in need of housing: the HUD position to recapture and return funds to the Treasury or the Tribal position to allow what funds are recaptured to be reused among our Indian brothers and sisters?

I hope that this committee will give serious consideration to recapture/reuse legislation. The Navajo Nation is ready to work with committee staff on this issue.

I would like to thank the Committee again for making this time available to hear the views of the Navajo Nation.

STATEMENT OF DAN RAINCLOUD, JR., TRIBAL REPRESENTATIVE, RED LAKE BAND OF CHIPPEWA INDIANS, ON BEHALF OF THE NATIONAL AMERICAN INDIAN HOUSING COUNCIL

Mr. Chairman and members of the Senate Appropriations Sub-Committee for HUD Independent Agencies. I am honored to have this opportunity to represent the Red Lake Band of Chippewa Indians and the National American Indian Housing Council before your committee. The testimony I present today on Indian Housing is on behalf of Indian families and especially homeless Indian children throughout this nation.

Since the Indian Housing Program within the Department of Housing and Urban Development (HUD) was initiated in 1961, more than 52,000 family units have been constructed in Indian country that would not be there today without the HUD Indian Housing Program. The result of these units has been to provide thousands of Indian children & families the opportunity to enjoy an upbringing in an atmostphere that is within the framework of the American way which is to strive to improve the standard of living for every American, whether Indian or non-Indian. The success of the program to date has been phenomenal towards achieving this end of opportunity for those families and children lucky enough to have been selected for a "HUD" home. The program has likewise provided tremendous hope for those disadvantaged Indian families and children that have not been selected, but remain hopeful that their turn will come to participate in the "HUD Indian Housing Program". These hopes and opportunities, which have been provided so successfully for so many families are earmarked for extinction, if the present administration and HUD are successful in their desire to eliminate new development for assisted housing and to recapture funding for thousands of units authorized by Congress but not yet constructed.

In the arena of fiscal control, Gramm-Rudman-Hollings and deficit reduction, there are several programs which warrant consideration beyond across-the-board cuts because of the tremendous service that the program offers in the way of healthy living conditions, self esteem, pride, hope and opportunity to a disadvantaged people. The Indian Housing Program in HUD is such a program. There has been a recommendation from HUD to suspend the development of new Indian Housing as well as to recapture funding for those older projects in the pipeline that are not yet under construction. Such a suspension and recapture would be devastating to the program that has come so far and done so much for Indian people, and even more devastating to the hopes of disadvantaged Indian families and children across this nation. It is argued that the suspension and recapture would only be a temporary setback for a five year period and when fiscal control is established the program would resume. Such an argument is irrational and self serving without any consideration for the families and children that will be irreparably damaged by such an action. The choice is not to provide a program to either serve those in need now or to serve those in need five years down the road. The need is now and in five years and the decision must be to fill that need now and in five years and as long as the need is there if necessary. To apply the "now or later" logic would be equivalent to applying the same logic in a military situation as follows:

> Military Paramedics come upon their wounded soldiers on a battlefield but because they have limited funds for supplies and they know there will always be a need to serve wounded soldiers down the road, they choose to pass by the current wounded in favor of the future wounded. The sufferings of the current wounded are no less than the sufferings of the future wounded, and as it should be with Indian Housing, the choice is not either/or, but both. It is not the American way to play the suffering of one against the suffering of another, but rather to provide equally to both.

Presently within HUD and the administration there is a movement away from new development for assisted housing programs and towards a voucher system to provide shelter to those in need. As shown in Exhibit A (attached) a voucher system assumes an existing stock of units available from which families may rent and utilize the voucher subsidy. In Indian Country there is literally no housing stock available. A voucher system, if applied also to Indian Housing, would effectively terminate the program from assisting the country's most needy citizens, Indian families and children. The public Housing Program has been assisting Non-Indians for nearly 35 years longer than it has provided assistance to Indians. This has resulted in an Indian Housing Program that has never been able to come close to meeting the need for current housing units, much the less to provide a stock from which a voucher system could be applied. In light of the need and lack of supply, it is unconscionable for HUD and the administration to propose to terminate new development for the Indian Housing Program and further to allow the recapture of funding for units appropriated in the past but not yet constructed. The direction instead must be a recognition and acknowledgement of the unique situation with Indian Housing and to respond with a continued development program and legislation to allow recaptured funds to be redistributed for construction of the desparately needed units in Indian Country. Under current law, recaptured funds are returned to the treasury and thereby forever lost to the Indian Housing Program and to the original intent of providing homes to needy people.

Since the establishment in 1980 of Regional Offices of Indian Programs, Housing Authorities have made tremendous strides in the area of improved management, reduced construction costs and serving the needs of homeless Indian families. All the accomplishments were spurred on by the hope that through documented improvements in these areas, new development projects would be forth coming. The vast majority of Housing Authorities have accomplished improvement goals and are now in line for development projects. Some, however, have had problems in moving development projects into a construction stage, and these pipeline units are now subject to recapture, which will result in penalizing the majority through no fault of there own. The result should not be such a penalty but rather a reward of units redistributed from the stalled pipeline. This would give those Housing Authorities with problems in moving projects to construction the time to resolve problems and qualify for future projects. Those of us who work with the Indian Housing Program on a daily basis, recognize that the need for housing far outreachs the supply and therefore cannot understand the desire by some to recapture funding without redistribution for Indian Housing. In light of this, it is interesting to note that the $100,000,000 sought by the administration for aid to the Contras of Nicaragua would fund the 2,000 units appropriated for Indian Housing by Congress for FY'86.

In 1983, Secretary Pierce established his Secretary's Committee on Indian and Alaska Native Programs to assure Indian input in changes to the HUD Indian Housing Program. The committee, composed of tribal and housing authority representatives from across the nation, has been very successful in its intent. Unfortunately , the committee cannot address legislative changes that are needed to compliment the directions pursued by the committee in steering the HUD Indian Housing Programs into the most effective and efficient direction. When the Indian Housing Program was authorized in the early 1960's, the program set down way a theory based on the successes and shortcomings of the Public Housing Program. Since those early days, those who have followed the program realize that there are unique differences that are not being addressed by the Indian Housing Program as it is now written. The program has unquestionably fulfilled a tremendous housing need, but the road to accomplishment has had rough spots, which if eliminated would fine tune the program. The areas needing adjustment to accomplish a workable product are largely beyond the scope of this testimony, but one area of critical concern is the 30% rule for rent payments. The rule is extremely hard on families with incomes only half that of the recognized poverty level, yet 30% of their meager income must go to support a dwelling, which in many cases results in binding the family to a poverty situation. A possible solution is to increase individual deductions for family members such that the family has an income to live on prior to committing 30% rent.

In light of the testimony presented here today and especially the impact that recent developments in the Indian Housing Programs have on the lives and upbringing of Indian people, we request that Congressional hearings be held on the issue of Indian Housing. Hearings would provide Congress with the information needed in order to make informed legistative decisions concerning Indian Housing. In addition, the established commitment to seek Indian input on issues affecting Indian people would be fulfilled in the interest of Self-Determination.

In summary, we feel that there is a need for continued new development for the Indian Housing Program, recaptured funds from pipeline projects must be redistributed to Indian Country, that the HUD Indian Housing Program works but needs adjustments to account for unique differences in Indian Housing vs Public Housing, and that the above issues could best be understood by all through Congressional hearings.

This concludes my prepared remarks. I will be happy to respond to any questions.

Exhibit A

THE REUSE OF INDIAN HOUSING PROGRAM RECAPTURED FUNDS

March 10, 1986

In recognition of the tremendous need for housing in Indian Country, Tribes and Indian Housing Authorities have been trying for several years to get legislation that would allow reuse of recaptured Indian Housing Program funds. Since reuse of recaptured funds would have an immediate impact on the severe housing shortage in Indian Country, it is urgent that all possible efforts be utilized to impress upon Congress that legislation is needed now to provide for reuse of the recaptured funds. Reuse would solve two significant problems facing the Indian Housing Program, those being a stalled pipeline and homes for Indian Families.

Currently, the arguement that surfaces most frequently concerning reuse for Indian Programs is: Why should Indian Programs have reuse and not Public Housing? This summary is directed toward the answer to that question, which is very clear to those within the Indian Housing Program but has not been clearly conveyed to Congress.

PUBLIC HOUSING	INDIAN HOUSING
No new development programs for low income families. Need is to be met by use of a voucher program to utilize existing housing stock. (reference: HR 3038 & Senate report 99-129)	No existing housing stock in Indian Country. Voucher program would force Indian families off reservations and into cities where available housing stock is located.
Program began in 1937 and has provided hundreds of thousands of housing units and assistance for nearly 50 years.	Program authorized for Indians in 1961 with very few Tribes getting involved until the late 1960's, with 50,000+ units provided over approximately 20 years.
Alternative housing opportunities are available,regardless of condition or cost to purchase or rent. (reference: St. Paul Pioneer Press & Dispatch, 3-9-86, or Want Ads from any city paper)	NO alternative housing available of any kind. Structures including churches, schools and otherwise condemned buildings are used to shelter Indian families. (reference: Indian Housing, Worst in Nation, published by the Native American Rights Fund of Boulder, Colorado)
Employment opportunities are available which provide avenues towards non-dependence on assisted housing programs.	NO employment opportunities are available. Poverty levels in American Indian populations are higher in every case than in non-Indian populations. (reference: Housing Assistance Council report of September, 1985, and Taking Stock, 1984)
Unmet housing need left by recaptured pipeline project funds can be absorbed by existing housing stock and the voucher program.	Unmet housing need left by recaptured pipeline project funds cannot be absorbed as there are no housing units available with which to utilize the voucher program in Indian Country.
Construction of Assisted Housing units from the pipeline is contracted to construction companies that have the opportunity to bid work elsewhere.	Tribes and Indian Housing Housing Authorities utilize local employment to construct housing projects and do not have the opportunity to compete for non-Indian work to employ local workers.

Public Housing (cont.)	Indian Housing (cont.)
Alternatives to current Assisted Housing Programs are being proposed by HUD.	Alternatives to the current Assisted Housing Program that HUD proposes do not address the unique problems of the Indian Housing need, specifically the voucher program. (reference: Housing and Development Reporter, 1-27-86, pg. 695, Housing Policy.
Organizations critical of the Assisted Housing Program and seeking its termination, support the retention of the voucher system as the government program for Public Housing Assistance. (reference: Housing and Development Reporter, 1-27-86, pg. 688, Federal Budget - Heritage Foundation)	Organizations critical of the Assisted Housing Program do not consider the plight of the Indian families in the event of termination of assisted housing, leaving only the voucher program. Indian families, documented as the very neediest for assisted housing, would be eliminated from the Federal Assisted Housing Program.

The bottom line in the fight by Indian Tribes to retain and construct the pipeline units is that Public Housing in non-Indian areas can, and will be in the future, addressed by alternative methods, which diminishes the need for new development. In Indian Country, the housing need is not and cannot be met either now nor in the future by the same methods as are proposed for Public Housing Assistance. Housing assistance for Indians requires new construction both from the reuse of pipeline funds and through appropriations for new units.

The underlying factor for success of a voucher delivery system for assisted housing is the availability of an existing housing stock. This availability is not now, nor will it be availabile in the future in Indian Country. With that in mind, the alternative is new development, as well as the reuse of recaptured pipeline funds, as the Assisted Housing Program that will work in Indian Country. Indian Housing Authorities have proven their ability to move projects through the pipeline very effectively in the past 18 months. What is requested now is the opportunity to get the units out of the pipeline and thereby to house needy Indian families where ever they may be.

STATEMENT OF DR. HENRY LEWIS III, ASSISTANT DEAN, COLLEGE OF PHARMACY, FLORIDA A&M UNIVERSITY

Senator GARN. Is Dr. Henry Lewis here? Dr. Henry Lewis, III, assistant dean, College of Pharmacy, Florida Agricultural and Mechanical University.

Dr. LEWIS. Good morning.

Senator GARN. Good morning.

Dr. LEWIS. Chairman Garn, I am Henry Lewis, assistant dean of the College of Pharmacy and Pharmaceutical Sciences at the Florida Agricultural and Mechanical University in Tallahassee, FL.

I appreciate the opportunity to represent the colleagues of my university and share with you and your committee some of our unique programmatic research and professional activities in the college and university, many of which are of national significance. I would like to share further concerns that threaten to curtail this activity, if a proper support base is not realized in the near future.

First, allow me to provide some background information relative to our health professions school and its importance nationally in terms of supplying health manpower personnel who are expert relative to medication and drug-related problems and diseases.

FLORIDA A&M PHARMACY PROGRAM

The pharmacy program at Florida A&M University is one of four such programs at historically black colleges and universities. For the past 10 years, Florida A&M University has been a leading producer of black pharmacy practitioners. We have produced some 16 percent of some 72 schools and colleges of pharmacy nationwide.

Our college has produced some 60 percent of all post-baccalaureate doctor of pharmacy degree recipients. Most recently, we became the only college of pharmacy at the historical black colleges to initiate the Ph.D. program in pharmaceutical sciences.

Since 1975, less than 15 black males and only one black female have earned the Ph.D in pharmaceutical science in this very important area, while better than 2,000 have been produced nationwide. Because of our commitment, tradition, and concern, the College of Pharmacy at Florida A&M will positive impact this disparate situation in the near future.

In addition to the structured programmatic contributions, our college has emphasized, for the past 10 years, strong research and professional activity of national and international significance. We have made new and important discoveries in health care that have led to the patenting of new drugs and the development of new techniques for the better treatment of patients.

Most recently, through our south Florida affiliation, the clinical aspect of our program is serving as a national model for advising the elderly, especially minority elderly, and other medically underserved and noncompliance patients about their prescription drugs. This is a national health crisis and our college, due to its strong clinical component, is making a significant impact on the problem.

For the past 5 years, the research program has involved more than 10 percent of our 300 undergraduate students and all of our faculty and post-baccalaureate students. The strong research activity has resulted in our college being designated a center of excellence by the board of regents of the State University System.

Our college is specifically noted for its accomplishments in the area of chronophysiology and chronopharmacology. While this work is supported by the National Aeronautics and Space Administration, and the National Institutes of Health, its significance is extremely important in terms of space travel, space labs, and even transmeridian air flights while here on Earth.

DEVELOPMENT OF CHRONOBIOTICS

The possibility of developing chronobiotics and compounds that can synchronize and desynchronize human subjects is being studied and advanced in our laboratories. The importance of this research ranges from an extreme interest by our national defense to similar concerns relative to athletic performance when people travel across new time zones.

The June 1 Chronicle on Higher Education wrote that, "According to Dr. Walker at the Florida A&M University College of Pharmacy, their researchers are working to develop a new drug that will make it possible for individuals to shift their circadian cycle from one time zone to another, without harm."

This research has tremendous importance in medicine, especially in terms of proper treating of patients with drugs for illnesses with minimal toxic effects. The May 27, 1978, British Medical Journal, in an editorial relative to a recent international symposium, hosted by the College of Pharmacy, "The Florida A&M University Conference covered many topics from endocrinology and parasitology to neuropharmacology. Chronobiology is a new science and chronotherapeutics may well be a new skill for clinicians to learn as the evidence accumulates of the importance of the timing of treatment for either the day or the hour."

We have faculty currently working on a unique project which involves microbial degradation of the fuel hydrazine, which is a byproduct of our space shuttle. We have a group of faculty deeply involved in motion sickness research. We are presently the only academic unit to our knowledge proposing to synthesize and test new drugs for motion sickness. Syndicated columnist Carl Rowan wrote in August 1983 that, "Scientists in Florida A&M University's College of Pharmacy are working on the problem of trying to develop medicines to combat space sickness."

The college has established an excellent research support from such aqencies as the National Institutes of Health, the National Aeronautics and Space Administration, the Office of Naval Research, the Agency for International Development, as well as the Department of Education.

Total committed research dollars generated by our faculty is at an all-time high of $11.8 million through the year 1991.

SPECIAL TRAINING PROGRAMS

The college is also involved in some special training programs. One such program is the Summer Space Life Sciences Training Program, between the College of Pharmacy at Florida A&M and the John F. Kennedy Space Center. Each summer, from 1985 through 1992, Florida A&M will contract 30 college students nationwide to conduct research in the life sciences at NASA. This is a hands-on, 6-week program designed to increase the pool of future aerospace scientists. This is the only such program in the Nation.

Our college is one of the leading research institutions, but the quality and quantity of research and research training is seriously threatened due to the lack of adequate facilities. In its urban development, the city of Miami has donated to the university and the College of Pharmacy a commercial tract of land, 2.4 acres, valued at approximately $4.6 million, for the purpose of constructing a research facility in the city of Miami.

Approximately $5.6 million are needed to construct, staff and equip the research facility. The generous gift of the city of Miami, along with the needed $5.6 million to construct this research laboratory, will allow Florida A&M to expand its current research focus and become one of the leading biomedical and life sciences centers not only at historical black colleges, but any university.

In addition, the construction of this research facility will allow Florida A&M University to expand its research focus to include AIDS, particularly since Miami is one of the Nation's leading cities for AIDS, as well as expand our geriatric research.

Chairman Garn, I appreciate the opportunity to appear before your committee and I thank you for allowing me to explain some of our programs at the College of Pharmacy at Florida A&M and our concerns relative to their continued existence.

SPACE ADAPTATION SYNDROME

Senator GARN. Thank you very much, Dr. Lewis. I can tell you from personal experience, Scapelamine doesn't work. If you have some new medication that you can come up with, the astronauts would appreciate it greatly, at least half of them would. But there is no doubt from the research I did on board the shuttle, at this point, if you take medication, you feel better in 2 days, and if you don't take medication, you feel better in 2 days. It has absolutely no effect whatsoever.

Dr. LEWIS. That is why we are trying to come up with a medication. We think that we have something promising in the works right now.

Senator GARN. I think the thing you are going to find a problem with is that it affects people so entirely differently. As I observed my crew, there was no pattern of the effects of space adaptation syndrome, to use the formal name. It is amazing how differently it affects different people. So you may have to have multiple medications for different symptoms.

I guess the most puzzling of all, and I am sure you are aware of this, is those who do not feel any ill effects at all. They just throw up involuntarily without any feeling of being sick, which is not the usual situation. It may be the toughest one of all to combat. No feeling of nausea, no headache, no dizziness, no paller change, none of that. Sorry about that folks, it is the way.

Dr. LEWIS. We are trying in simulate a similar condition here on Earth and, hopefully, with that simulation, we can have drugs that will work. We know that drugs work differently on different people, that is why the circadian cycle that we are looking at, we know that people react differently to different drugs, as well as different times of day.

Senator GARN. Thank you, Dr. Lewis.

Dr. LEWIS. Thank you so much.

[The statement follows:]

STATEMENT OF DR. HENRY LEWIS III, ASSISTANT DEAN, COLLEGE OF PHARMACY, FLORIDA A&M UNIVERSITY

TO CHAIRMAN GARN AND MEMBERS OF THE SUB-COMMITTEE. I AM HENRY LEWIS, ASSISTANT DEAN OF THE COLLEGE OF PHARMACY AND PHARMACEUTICAL SCIENCES AT THE FLORIDA AGRICULTURAL AND MECHANICAL UNIVERSITY IN TALLAHASSEE, FLORIDA. I APPRECIATE THE OPPORTUNITY TO REPRESENT THE COLLEAGUES OF MY UNIVERSITY AND SHARE WITH YOU AND THE COMMITTEE SOME OF OUR UNIQUE PROGRAMMATIC, RESEARCH AND PROFESSIONAL ACTIVITIES IN THE COLLEGE AND UNIVERSITY, MANY OF WHICH ARE OF NATIONAL SIGNIFICANCE. I WOULD LIKE TO SHARE FURTHER CONCERNS THAT THREATEN TO CURTAIL THIS ACTIVITY, IF A PROPER SUPPORT BASE IS NOT REALIZED IN THE NEAR FUTURE.

FIRST, ALLOW ME TO PROVIDE SOME BACKGROUND INFORMATION RELATIVE TO OUR HEALTH PROFESSIONS SCHOOL AND ITS IMPORTANCE NATIONALLY IN TERMS OF SUPPLYING HEALTH MANPOWER PERSONNEL WHO ARE EXPERTS RELATIVE TO MEDICATION AND DRUG RELATED PROBLEMS AND DISEASES. THE PHARMACY PROGRAM AT FLORIDA A&M UNIVERSITY IS ONE OF FOUR (4) SUCH PROGRAMS AT HISTORICALLY BLACK COLLEGES AND UNIVERSITIES (HBCU's). FOR THE PAST TEN YEARS, FLORIDA A&M UNIVERSITY (FAMU) HAS BEEN THE LEADING PRODUCER OF BLACK MINORITY B.S. PHARMACY PRACTITIONERS. WE HAVE PRODUCED SOME 16% OF THE TOTAL OUT OF SOME 72 SCHOOLS AND COLLEGES OF PHARMACY IN THE NATION. OUR COLLEGE HAS PRODUCED SOME 60% OF ALL POST-BACCALAUREATE DOCTOR OF PHARMACY BLACK MINORITY GRADUATES. MOST RECENTLY, WE BECAME THE ONLY COLLEGE OF PHARMACY AT THE HBCU's TO INITIATE THE PH.D. DEGREE IN THE PHARMACEUTICAL SCIENCES. SINCE 1975 LESS THAN 15 BLACK MALES AND NO BLACK FEMALES HAVE EARNED THE PH.D. IN THIS VERY IMPORTANT BASIC SCIENCE, WHILE BETTER THAN TWO THOU-

SAND HAVE BEEN AWARDED TO MAJORITY AND OTHER MINORITY CANDIDATES. BECAUSE OF COMMITMENT, TRADITION AND CONCERN, THE COLLEGE OF PHARMACY AT FAMU WILL POSITIVELY IMPACT THIS SITUATION IN THE NEAR FUTURE. IN ADDITION TO THE STRUCTURED PROGRAMMATIC CONTRIBUTIONS, OUR COLLEGE HAS EMPHASIZED – FOR THE PAST TEN YEARS – STRONG RESEARCH AND PROFESSIONAL ACTIVITY OF NATIONAL AND INTERNATIONAL SIGNIFICANCE. WE HAVE MADE NEW AND IMPORTANT DISCOVERIES IN HEALTH CARE THAT HAVE LED TO THE PATENTING OF NEW DRUGS AND THE DEVELOPMENT OF NEW TECHNIQUES FOR THE BETTER TREATMENT OF PATIENTS. MOST RECENTLY, THROUGH OUR SOUTH FLORIDA AFFILIATION, THE CLINICAL ASPECT OF OUR PROGRAM IS SERVING AS A NATIONAL MODEL FOR ADVISING THE ELDERLY, ESPECIALLY THE MINORITY ELDERLY AND OTHER MEDICALLY UNDER SERVED AND NON-COMPLIANCE PATIENTS, ABOUT THEIR PRESCRIPTION DRUGS. THIS IS A NATIONAL HEALTH CRISIS AND OUR COLLEGE, DUE TO ITS STRONG CLINICAL COMPONENT, IS MAKING A SIGNIFICANT IMPACT ON THE PROBLEM.

FOR THE PAST FIVE YEARS, THE RESEARCH PROGRAM HAS INVOLVED MORE THAN 10% OF OUR 300 UNDERGRADUATE STUDENTS AND ALL OF OUR FACULTY AND POST-BACCALAUREATE STUDENTS. THE STRONG RESEARCH ACTIVITY HAS RESULTED IN OUR COLLEGE BEING DESIGNATED A "CENTER OF EXCELLENCE" BY THE BOARD OF REGENTS OF THE STATE UNIVERSITY SYSTEM. OUR COLLEGE IS SPECIFICALLY NOTED FOR ITS ACCOMPLISHMENTS IN THE AREA OF CHRONOPHYSIOLOGY AND CHRONOPHARMACOLOGY. WHILE THIS WORK IS SUPPORTED BY THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION (NASA) AND THE NATIONAL INSTITUTES OF HEALTH (NIH), ITS SIGNIFICANCE IS EXTREMELY IMPORTANT IN TERMS OF SPACE TRAVEL, SPACE LABS, AND EVEN TRANSMERIDIAN AIR FLIGHTS WHILE ON EARTH. THE POSSIBILITY OF DEVELOPING CHRONOBIOTICS AND COMPOUNDS THAT CAN

SYNCHRONIZE AND DESYNCHRONIZE HUMAN SUBJECTS IS BEING STUDIED AND ADVANCED IN OUR LABORATORIES. THE IMPORTANCE OF THIS RESEARCH RANGES FROM AN EXTREME INTEREST BY OUR NATIONAL DEFENSE TO SIMILAR CONCERNS RELATIVE TO ATHLETIC PERFORMANCE WHEN PEOPLE TRAVEL ACROSS NEW TIME ZONES. THE JUNE 1, 1983 CHRONICLE OF HIGHER EDUCATION WROTE THAT, "ACCORDING TO DR. WALKER AT THE FAMU COLLEGE OF PHARMACY, THEIR RESEARCHERS ARE WORKING TO DEVELOP A NEW DRUG THAT WILL MAKE IT POSSIBLE FOR INDIVIDUALS TO SHIFT THEIR CIRCADIAN CYCLE FROM ONE TIME ZONE TO ANOTHER, WITHOUT HARM."

THIS RESEARCH HAS TREMENDOUS IMPORTANCE IN MEDICINE, ESPECIALLY IN TERMS OF THE PROPER TREATING OF PATIENTS WITH DRUGS FOR ILLNESSES WITH MINIMAL TOXIC SIDE EFFECTS. THE MAY 27, 1978 BRITISH MEDICAL JOURNAL, IN AN EDITORAL RELATIVE TO A RECENT INTERNATIONAL SYMPOSIUM – HOSTED BY THE FAMU COLLEGE OF PHARMACY WROTE, "THE FLORIDA A&M CONFERENCE COVERED MANY TOPICS FROM ENDOCRINOLOGY AND PARASITOLOGY TO NEUROPHARMACOLOGY. CHRONOBIOLOGY IS A NEW SCIENCE AND CHRONOTHERAPEUTICS MAY WELL BE A NEW SKILL FOR CLINICIANS TO LEARN AS THE EVIDENCE ACCUMULATES OF THE IMPORTANCE OF THE TIMING OF TREATMENT FOR EITHER THE DAY OR THE HOUR."

WE HAVE FACULTY PRESENTLY WORKING ON A UNIQUE PROJECT WHICH INVOLVES THE MICROBIAL DEGRADATION OF THE FUEL HYDRAZINE. WE HAVE A GROUP OF FACULTY DEEPLY INVOLVED IN MOTION SICKNESS RESEARCH. WE ARE PRESENTLY THE ONLY ACADEMIC UNIT, TO OUR KNOWLEDGE, PROPOSING TO SYNTHESIZE AND TEST NEW DRUGS FOR MOTION SICKNESS. SYNDICATED COLUMNIST CARL ROWAN WROTE IN AUGUST OF 1983 THAT: "SCIENTISTS IN FAMU's COLLEGE OF PHARMACY ARE WORKING ON THE PROBLEM OF TRYING TO DEVELOP MEDICINES TO COMBAT SPACE SICKNESS."

THE COLLEGE HAS ESTABLISHED EXCELLENT RESEARCH SUPPORT FROM

SUCH AGENCIES AS NIH, NASA, ONR, AID, AND DOE. . TOTAL COMMITTED RESEARCH DOLLARS GENERATED BY FACULTY IS AT AN ALL TIME HIGH OF 11.8 MILLION THROUGH THE YEAR 1991. THE COLLEGE IS ALSO INVOLVED IN SOME SPECIAL TRAINING PROGRAMS. ONE SUCH PROGRAM IS THE SUMMER SPACE LIFE SCIENCES TRAINING PROGRAM, BETWEEN THE COLLEGE OF PHARMACY AT FAMU AND THE J.F. KENNEDY SPACE CENTER. EACH SUMMER, FROM 1985 THROUGH 1992, FAMU WILL CONTRACT 30 COLLEGE STUDENTS NATIONWIDE TO CONDUCT RESEARCH IN THE LIFE SCIENCES AT NASA. THIS IS A HANDS-ON, SIX-WEEK PROGRAM DESIGNED TO INCREASE THE POOL OF FUTURE AEROSPACE SCIENTISTS. THIS IS THE ONLY SUCH PROGRAM IN THE NATION.

OUR COLLEGE IS ONE OF THE LEADING RESEARCH INSTITUTIONS, BUT THE QUALITY AND QUANTITY OF RESEARCH AND RESEARCH TRAINING IS SERIOUSLY THREATENED DUE TO THE LACK OF ADEQUATE FACILITIES. IN ITS URBAN DEVELOPMENT, THE CITY OF MIAMI HAS DONATED TO THE UNIVERSITY FOR THE COLLEGE OF PHARMACY REAL ESTATE TOTALING APPROXIMATELY 4 MILLION DOLLARS FOR THE PURPOSE OF CONSTRUCTING A RESEARCH FACILITY IN THEIR CITY. FUNDS ARE NOW NEEDED TO CONSTRUCT, STAFF, AND EQUIP THIS LABORATORY.

I APPRECIATE THE OPPORTUNITY TO APPEAR BEFORE THE COMMITTEE AND I THANK YOU FOR ALLOWING ME TO EXPLAIN OUR PROGRAMS AND OUR CONCERNS RELATIVE TO THEIR CONTINUED EXISTENCE.

Senator GARN. Is Mr. Alvin Block here?

Is Mr. James Hieatt here?

Would you like to come up please?

Mr. HIEATT. I don't see Dr. Norris Krone, who is going to testify with me. It would probably be better to wait until he arrives.

Senator GARN. Dr. Wirszup, would you like to testify?

NATIONAL SCIENCE FOUNDATION

STATEMENT OF DR. IZAAK WIRSZUP, PROFESSOR EMERITUS OF MATHEMATICS, UNIVERSITY OF CHICAGO, AND PRINCIPAL INVESTIGATOR, THE UNIVERSITY OF CHICAGO SCHOOL MATHEMATICS PROJECT

Dr. WIRSZUP. By all means, Senator. I am grateful.

Honorable Senator Jake Garn, honorable Senators, and distinguished Senators of the committee, thank you for your invitation to testify once again before this committee on the National Science Foundation and crucial issues in U.S. mathematics and science education.

In my previous testimony on behalf of the NSF Directorate for Science and Engineering Education, I have concentrated on the condition of precollege mathematics and science education and technical manpower training programs. Although some headway has been made, our precollege educational crisis has not yet been addressed on an appropriate scale.

AMERICAN MATHEMATICS TRAINING

Today I propose to include in my statement before this committee undergraduate and graduate mathematics programs as well, for recent studies and evidence point to an alarming situation in American mathematics training at all levels.

In 1981–82, the Second International Mathematics Study surveyed mathematics achievement in 24 countries. This study the most extensive since 1964, found that the comparative mathematics achievement of both American eighth-grade students and the top 5 percent of high school seniors studying our most advanced courses was at or near the bottom. These results underscore the fact that the United States is out of step in school mathematics with most of the world's developed nations.

A recent study comparing scholastic achievement of American, Chinese, and Japanese children in kindergarten and grades one and five shows that the gap in mathematics begins to open up very early in schooling. Scores of the American children displayed a consistent decline compared to those of the Chinese and Japanese children.

We must raise the Nation's general level of educational achievement, especially in mathematics and science, by 3 to 4 years—equivalent to the level already achieved by most secondary school graduates in Japan, the Soviet Union, Eastern Europe, and even South Korea and Taiwan.

Foremost among the issues to be confronted are curricular reform and the complex problems of teachers—preservice and in-service training, competence, recruitment, salaries, and the teacher's role in school and society. The availability of qualified mathematics teachers is already critically low.

A 1984 study found that of approximately 110,000 mathematics teachers in public schools——

Senator GARN. Dr. Wirszup, if I could interrupt you for a moment. We are playing musical Senators this morning. I apologize for leaving in the middle of your testimony, but I have an 11 o'clock other meeting, and Senator Proxmire is here to listen to your testimony. I do apologize for having to leave.

Thank you very much for coming.

Dr. WIRSZUP. Thank you very much.

A 1984 study found that of approximately 110,000 mathematics teachers in public schools, 6,600 leave the profession each year. While this exodus continues, the number of new entrants in mathematics teaching is declining. The number of bachelor's degrees conferred in mathematics education shrank from 2,217 in 1970–71 to 798 in 1980–81, a drop of 64 percent.

According to the National Institute of Education by 1992, the demand for new teachers in all areas will outstrip the number of new teacher graduates by 34 percent.

COLLEGE MATHEMATICS

The state of college mathematics is a direct consequence of the crisis in our school mathematics. In 1980 only 1 percent of high school seniors named mathematics as their preferred field of study in college; 2 years later that figure had dropped to 0.7 percent.

In 1983 a total of only 12,557 bachelor's degrees in mathematics were awarded in the United States, compared to 27,565 in 1970. America's production of B.A.'s and Ph.D.'s in mathematics, sciences, and engineering does not begin to approach projected needs.

On March 30, 1986, the Task Committee on Undergraduate Science and Engineering Education submitted its final report to the National Science Board, and added, "In this report we state our conviction that the National Science Foundation must assume a leadership role and provide highly leveraged program support for undergraduate science, mathematics, and engineering education in order to successfully meet critical needs that affect the health of the Nation."

Despite the increasing demand for collegiate mathematics, too few new Ph.D.'s are in the pipeline for replacement positions. While the United States produced 1,236 Ph.D.'s in mathematics in 1970, in 1983 the number had dropped to 698. The number of master's degrees awarded in mathematics has also dropped from 5,648 in 1970 to 2,839 in 1983.

Totally apart from education, the manpower needs of industry and defense are truly staggering. The total number of doctorates awarded in mathematics and physics, and engineering does not come close to meeting the needs of the future, and is already falling short of national requirements for industry and academia.

I can only reiterate that mathematics is the very cornerstone of American science and engineering. If it is permitted to crumble so, too, will our prosperity and security.

DIRECTORATE FOR SCIENCE AND ENGINEERING EDUCATION

Thanks to this committee's generous budgeting for fiscal year 1986, the National Science Foundation has further strengthened the work of its Directorate for Science and Engineering Education. The Directorate's leadership is now well established, and its staff has been supplemented by experienced university research scientists and college science educators.

The quality of the proposals it receives is rising continuously, and the Directorate has been able to support creative ideas from around the country, and to award funding on the basis of quality and merit.

The Directorate is ready to undertake the new set of assignments from the National Science Board for radically improving American undergraduate science and engineering education.

My opinion, and that of many in the scientific and educational communities, is that the Directorate has amply fulfilled its promise and fully deserves the support it has requested for fiscal year 1987. This will be a year of crucial planning, development, and expansion that will bring a new dimension and new responsibilities for science and engineering education at all levels.

I appeal to you, Senator Proxmire, and the distinguished Senators of this committee, to support the Directorate's proposed activities in fiscal year 1987. I submit herewith, for the hearing record, a statement of April 30, 1986, addressed to Senator Garn. I am most grateful for the opportunity to address these critical issues.

Senator PROXMIRE [presiding]. Thank you, Dr. Wirszup, I am most impressed by your testimony. I notice that you stress the fact that an average Illinois mathematics student matched against 100 of his Japanese counterparts would rank 99th. That is a national disgrace.

Dr. WIRSZUP. This is true.

Senator PROXMIRE. Then you say, "Illinois' high achievers in mathematics"—and they are the people who blaze the way in technology, and so forth—"only 1 in 1,000 does as well as the top 100 out of 1,000 Japanese students."

Dr. WIRSZUP. You are correct.

Senator PROXMIRE. In other words, they are way, way ahead. I have heard that somehow our universities do a lot better as compared with the Japanese universities. According to what you give us here, though, the universities have far less to work with. The talent is not as strong as it is in Japan.

Dr. WIRSZUP. You are absolutely correct. Our universities are the most advanced institutions for graduate research, for programs, and learning in the world. Unfortunately, the number of graduating students has decreased consistently, especially American-born citizens. This is a major problem. It sounds strange that the foreign-born, like me, with an accent, are bringing up that figure. This was stated by Dr. Erich Bloch, the Director of the National Science Foundation.

The number of Ph.D.'s has decreased to less than 700 in mathematics, and again only half of them are American-born.

Senator PROXMIRE. Let me ask you one other question. Does this suggest to you that maybe 40 or 50 years from now, instead of the Nobel Prizes, if we have continued civilization and peace and not nuclear war, that the Nobel Prizes will be won increasingly by Japanese, and far less by Americans?

Dr. WIRSZUP. I am not in a position or I am not entitled to forecast that development.

Senator PROXMIRE. I am not asking for a forecast, but what is your feeling?

Dr. WIRSZUP. Senator, as you know, Nobel Prizes are usually given for achievements made some 20 or 30 years ago, and the state of developments now——

Senator PROXMIRE. Let's look at it 100 years from now. What I want to know is, will the present generation of the young people in America be unable to sustain the kind of technology excellence which we have been able to win over the last 2 years?

Dr. WIRSZUP. I am afraid that this probably may be the case.

Senator PROXMIRE. That they will not be able to.

Dr. WIRSZUP. They will not be able to.

Senator PROXMIRE. Thank you, Dr. Wirszup, very, very much for a very fine presentation. Your entire statement will be placed in the record.

[The statement follows:]

STATEMENT OF IZAAK WIRSZUP, PROFESSOR EMERITUS OF MATHEMATICS, THE UNIVERSITY OF CHICAGO

30 April 1986

Honorable Senator Jake Garn
and Distinguished Senators of the HUD-Independent Agencies Subcommittee:

Thank you for your invitation to testify once again before this Committee on the National Science Foundation and crucial issues in U.S. mathematics and science education.

As Chairman of this Committee, Senator Garn, you have shown exceptional understanding and foresight concerning these problems and their effect on the American economy and national security. In 1981, you acted to prevent the dismantling of the NSF Directorate for Science and Engineering Education, which would have caused irreparable damage; and over the past four years you have been instrumental in obtaining the Senate appropriations to help the Directorate increase the scope and effectiveness of its programs aimed at resolving our educational crisis. For this, the U.S. science and educational communities are indebted to you and the Committee.

In my previous testimony on behalf of the NSF Directorate for Science and Engineering Education I have concentrated on the condition of precollege mathematics and science education and technical manpower training programs. I have attempted to show in particular how the United States compares in these areas with the Soviet Union and Japan. The reason for my focus on school (K-12) education is that it is the very foundation of our Nation's strength, its economic vitality and security. Although some headway has been made — thanks in good part to the National Science Foundation — our precollege educational crisis has not yet been addressed on an appropriate scale. Recognizing and reporting the problem is not the same as resolving it.

Today I propose to include in my statement before this Committee undergraduate and graduate mathematics programs as well, for recent studies and evidence point to an alarming situation in American mathematics training at all levels.

Because mathematics education is a continuous sequential process from primary school through graduate school, changes in any part have important consequences both for other parts of mathematics education and for subsequent courses in science and engineering. The results of advanced research influence the curriculum at every level, while at the same time mathematics education lays the foundation for research of the future (C). The successes — or failures — of mathematics education are bound to resonate throughout our society.

The following statement includes a great deal of evidence from recent studies and reports (some of which I have paraphrased). The materials I have used most extensively are listed in Appendix I.

SCHOOL MATHEMATICS

Some Comparisons: The United States, the USSR, and Japan

To make an objective evaluation of American secondary schooling, we ought first to compare it with the educational systems of Japan, America's foremost industrial and technological competitor, and the Soviet Union, the other superpower and America's strategic adversary. Both Japan and the Soviet Union have strongly centralized educational systems with compulsory national curricula and uniform national examinations and standards of achievement. While I certainly do not advocate such centralization for the American form of democracy, I believe it is worth studying these different and highly successful systems.

The seriousness of our educational decline was first made clear by comparative studies of American and Soviet elementary and secondary mathematics and science education. I will review a few of these striking comparisons before turning to additional evidence.

The Soviet Union was the first country to introduce compulsory secondary schooling (in 1975); by now close to 100% of all young people complete secondary general education schools or equivalent secondary technical-vocational schools or technicums. The current secondary school graduation rate in Japan is 94 percent, and in the U.S. only 75 percent. Even more telling than these general statistics are comparisons of programs and enrollments in specific subject areas:

- The overwhelming majority of American students still take what is essentially arithmetic for 9 years. Since such repetition takes no account of their developing abilities, our students emerge from this demoralizing experience without the inclination or ability to pursue secondary school algebra and geometry, the hard sciences, or technical-vocational training. In almost all other industrialized countries, children complete arithmetic in six years; in the USSR and the Soviet-bloc countries of Eastern Europe, arithmetic, in combination with intuitive geometry, is taught in the first five grades.

- Comparisons in geometry are even more disturbing. Only half our students ever take any plane geometry. Most of them never master it, because we attempt to teach it in a "packaged" one-year course, at an advanced level, to students with inadequate preparation, even though empirical evidence and modern educational psychology tell us emphatically that we cannot. And since our high school students are not being taught solid geometry, they rarely have the workable perception of three-dimensional space that is essential to many areas of science, technical design, and engineering. In contrast, Soviet students study geometry continuously over a 10-year span: intuitive geometry in the first five years, semi-rigorous plane geometry in grades 6 through 8, and solid geometry in grades 9 and 10.

- While the great majority of Americans are struggling with nine years of arithmetic, Soviet students are working through a challenging and comprehensive compulsory mathematics curriculum that comprises six hours per week in grades 1 through 8 and five hours in grades 9 and 10 (a total of nearly 2,000 class hours over ten years). In this ten-year period the Soviet program has covered the equivalent of at least 13 years of the best American schooling in mathematics, and done so much more thoroughly and effectively, culminating in ninth- and tenth-grade courses that focus on a comprehensive introduction to calculus. Starting in 1985 the Soviets began extending their compulsory secondary education by one year. The 10-year secondary general education school is being replaced by an 11-year school and children are starting school a year earlier, at age 6 rather than 7.

- American secondary school physics, another building block of science education and technical training, is in extremely poor condition and must be changed radically. Less than one sixth of our high school students take the "packaged" one-year course in this discipline, while in the USSR all secondary school students take a compulsory five-year sequence of physics courses developed in accordance with the latest research in educational psychology. For some 16,000 U.S. school districts the total number of full-time physics teachers (many of whom have never received specific subject training in physics) is less than 8,000 and shrinking rapidly. The total number of physics teachers in Soviet general education day schools alone is 122,000 and the USSR trains another 8,500 specialized physics teachers every year.

- The pattern continues in other subjects. In chemistry, only 35 percent of our high school students take a one-year course, while all Soviet students complete four years of chemistry, including a full year of organic chemistry. Soviet students also receive six years of compulsory training in biology, one year of astronomy, three years of mechanical drawing, and ten years of workshop and technical training.

- Our educational crisis is by no means limited to mathematics and the sciences. Only 16 percent of our students receive any exposure to geography as a separate subject, mostly in the form of a one-semester course. Geography training -- and qualified high school geography teachers — have all but disappeared. In the Soviet Union, on the other hand, all students take a five-year sequence of courses in the physical, economic and political geography of the USSR and the world. The total number of geography teachers in the Soviet general education day schools is 95,000, and 6,000 specialized geography teachers are being trained every year.

Japan's economic achievements are well known. With .3% of the world's surface and 3% of its population, Japan accounts for over 10% of the world's production, and its share of world trade (excluding oil and food) has risen from 8% to 15% since 1960. The ascendancy of major Japanese industries such as steel, automobile manufacture, shipbuilding, and electronics is closely related to the superior quality of their human resources. Education in technology is especially advanced: engineers have become the symbol of Japanese enterprise, and nowhere is this more apparent than in the fast-growth field of electronics, where Japan produces almost 3 times as many engineers as the U.S.

Let us take a brief look at the schooling behind much of Japan's economic success. The Japanese school system consists of a 6-year primary school, a 3-year lower secondary and a 3-year upper secondary school. The first 9 grades are compulsory. The rate of graduation from grade 9 is 99.99%, and the graduation rate for upper secondary school (grade 12) is 94%. In terms of achievement, a typical Japanese student graduates from secondary school with roughly four more years of education than an average American high school graduate. The level of mathematics training achieved by Japanese students can be inferred from the following data:

> Mathematics I (4 hours per week), compulsory in grade 10, comprises algebra (including quadratic functions, equations, and inequalities), trigonometric functions, and coordinate geometry.
>
> In grade 11 40% of students take the easier of the elective courses, Mathematics II (3 hours per week), which comprises probability and statistics, vectors, exponential, logarithmic and trigonometric functions, and differentiation and integration in an informal presentation. The other 60% of students in grade 11 take two courses, Algebra-Geometry (3 hours per week) and Basic Analysis (3 hours per week). Algebra-Geometry comprises fuller treatments of coordinate geometry, vectors, matrices, and solid coordinate geometry. Basic Analysis includes a more thorough treatment of trigonometry and an informal but rather extensive differential and integral calculus.
>
> In the 12th grade 25% continue with mathematics. These students take an advanced course in Probability and Statistics (3 hours per week) and a rigorous course in Differential and Integral Calculus (3 hours per week).

In sum, the vast majority of our high school students have not studied physics, chemistry, geography, or a foreign language, and have had only a modicum of mathematics. Not only do they lack a solid foundation for further training; they cannot even apply basic mathematics and science to simple jobs. This results in a personal tragedy of shattered hopes for countless young Americans. It is also a national tragedy, for it diminishes America's overall position in the world and places a tremendous burden on the economy and society; on industry, which must invest huge sums even for narrow, short-term training; and on institutions of higher learning, which must provide costly remedial courses.

To give some idea of the relatively low achievement levels of American students, I will cite results from three recent studies.

The Second International Mathematics Study (I) conducted in 1981-82 by the International Association for the Evaluation of Education Achievement (IEA) surveyed the mathematics curriculum provided for two groups of students, those in the grade with the modal number of thirteen-year olds (Group A in the attached figures, Appendix II) and those enrolled in advanced mathematics classes in the terminal year of secondary school (Group B) in 24 countries. In the U.S. approximately 7,500 eighth-grade students and 6,000 twelfth-grade students in Precalculus or Calculus classes participated in the study. These students completed internationally-developed mathematics achievement tests at the beginning of the 1981-82 academic year and again at the end of the school year.

A summary of U.S. results in this International Mathematics Study, published by the University of Illinois in 1985, shows U.S. elementary and secondary students lagging behind students from other countries in achievement in mathematics (see Appendix II). What is particularly disturbing is a significant decline in U.S. achievement in arithmetic and geometry since 1964 — when it was already slightly below the international mean.

Achievement results indicate a mean performance for U.S. students essentially in the middle of the distribution of international means for 13-year-old students in the areas of Arithmetic, Algebra and Descriptive Statistics. While U.S. students were slightly above the international average in computational arithmetic (calculation), they scored well below the international average in non-computational arithmetic (e.g., problem solving) **(I)**. In the area of Geometry, the U.S. eighth-grade mean was near the 25th percentile of the international distribution. U.S. performance in Measurement was substantially below that level.

Precalculus students, who made up the great majority of the senior high school sample in the U.S., achieved at a level substantially below the international mean and, in some cases, ranked with the lower one-fourth of the countries participating in that phase of the study. (America's poor performance is due in part to large gaps in the curriculum. High percentages of test items had never been taught to U.S. 12th-grade students in the study: 38% of geometry items, for example, and 55% of items in probability and statistics.) In several test areas, the U.S. ranked in the bottom quarter of the participating countries together with Chile, the Ivory Coast, Nigeria, Swaziland, and Thailand. This underscores the fact that the U.S. is out of step in school mathematics with most of the world's developed nations, as the comparative mathematics achievement of both our eighth-grade students and the top 5 percent of high school seniors studying our most advanced courses was at or near the bottom. The authors of the report state that "By any reasonable standard there is considerable cause for alarm in these comparisons."

There has been a persistent belief, even among American educators, that while the bulk of our population may not be receiving the best education, our top students are as good as the top students anywhere in the world. This contention was refuted by a study at the University of Illinois at Chicago conducted by Herbert J. Walberg, Delwyn L. Harnisch, and Slow-Long Tsai. Fifteen-, sixteen-, and seventeen-year-olds from Japan and from Illinois took the High School Mathematics Test developed by Educational Testing Service; the results led the research team to the following conclusions:

> An "average" Illinois high school mathematics student matched against 100 of his Japanese counterparts would rank 99th.
>
> Of Illinois high achievers in mathematics, only 1 in 1,000 does as well as the top 100 out of 1,000 Japanese students.

A more recent study suggests that this gap begins to open up very early in schooling. Stevenson, Lee and Stigler **(J)** compared scholastic achievement of American, Chinese and Japanese children in kindergarten and grades 1 and 5. American kindergarten children lag behind Japanese children in their understanding of mathematics; by fifth grade they are surpassed by both Japanese and Chinese children. Consistently superior performance of the Japanese children and rapid improvement in the scores of the Chinese children from kindergarten through fifth grade are evident from the chart in Appendix III. Scores of the American children displayed a consistent decline compared to those of the Chinese and Japanese children.

Cognitive abilities of children in the three countries are similar, but large differences exist in the children's life at school, the time spent on homework, the attitudes and beliefs of their mothers, and the involvement of both parents and children in schoolwork. Chinese and Japanese children spend over 33% more days in school than their American counterparts. The percentage of Chinese and Japanese fifth-graders who have their own desk at home is 50% greater than the percentage of American fifth-graders. The percentage of Chinese and Japanese parents who buy their children supplementary mathematics workbooks is double the percentage of American parents who make this investment, and the amount of time parents spend with children on their homework is equally disproportionate. The study concludes that "without greater acknowledgement of the importance of the elementary school years to children's education in mathematics and science, legislation to improve instruction in secondary schools may result in little more than exercises in remediation for most children" **(J)**.

Toward Resolving the Crisis in Our Schools

In order to reestablish and then maintain our country's scientific and technological superiority and industrial and economic vitality, and to develop a strong national defense, we must raise the nation's general level of educational achievement by three to four years -- equivalent to the level already achieved by secondary school graduates in Japan, the Soviet Union, Eastern Europe, and even South Korea and Taiwan.

Resolving our educational crisis will be an undertaking of unprecedented magnitude. It is evident that the policies and measures instituted to date do not begin to approach the changes needed. The only answer is a federally led national mobilization for education and a coordinated mobilization in each of the states. This will require a sustained effort by all segments of our society, private and public investment and sacrifice, and, above all, imaginative and engaged leadership at all levels of government.

In the past three years, growing awareness has inspired a number of grassroots movements involving parents, teachers, and leaders of industry and government. We are now witnessing a period of increased hope and expectations on the part of the American public. In some school districts students' performance has even improved somewhat. While these positive developments should be encouraged and expanded, we must not lose sight of the global picture. These are improvements on a relatively small scale. To believe that the measures we are now taking are adequate would be a dangerous complacency. We must continue to measure the state of U.S. education vis-a-vis that of other nations. Foremost among the issues to be confronted are curricular reform and the complex problems of teachers -- preservice and inservice training, competence, recruitment, salaries, and the teacher's role in school and society. The responsibilities and treatment of teachers are broader societal issues which nonetheless also deserve scrutiny and action by government at every level.

Teachers

On the complex issue, I will limit myself today to the matter of availability of qualified mathematics teachers. The current supply-and-demand situation is already critical.

A low estimate, based on little change in current trends of overall supply and demand, indicates an annual shortage of 3,700 mathematics teachers. If teachers currently assigned to mathematics classes but not qualified to teach this subject were to be replaced at a rate of 5 percent per year of all teachers in the field, the annual shortage would be 9,200. The annual demand for new or returning high school teachers of mathematics and science is projected to be at least twice the expected supply. If school systems were to make a concerted effort to replace unqualified teachers, the need would be for three or four times the expected supply of new (or returning) teachers.

According to Howe and Gerlovich (1982), 44 of 47 state authorities responding to a survey reported shortages or critical shorages of mathematics teachers. And the prospects for change are not good. A 1984 NSTA study found that of approximately 110,000 mathematics teachers in public schools, 6% (ca. 6,600) leave the profession each year. While this exodus continues, the number of new entrants in mathematics teaching is declining. According to 1983 NCES data, the number of B.A. degrees conferred in mathematics education shrank from 2,217 in 1970-71 to 798 in 1980-81, a drop of 64%.

What is being done to combat current and impending shortages amounts to a serious compromising of teaching quality. To begin with, even certified elementary mathematics specialists and secondary mathematics teachers have mediocre subject training by comparison with school mathematics teachers in the USSR. To compound the problem, the percentage of U.S. mathematics teachers with subject training and certification is grossly inadequate, and dropping. The percentage of specialist mathematics teachers in elementary school was only 1.4% in 1982, according to a study by NCES. NCES also found (1979-80) that of secondary school teachers certified or eligible for certification, only 42% of those teaching mathematics were certifiable in that field.

So-called out-of-field assignments to combat teacher shortages are creating more problems than solutions. In some states (e.g., Alabama, New Hampshire) teachers may teach up to 49% of their teaching day out-of-field. Before Utah attacked the problem, 1983-1984 data showed that for teachers with minor teaching assignments in mathematics, 70.6% had neither a college major nor a minor in that field. For teachers with minor assignments in general science, 78% had neither a college major nor minor in science. A 1984 report from Washington State showed almost one-half of its junior high mathematics teachers and over one-third of its high school mathematics teachers "without preparation."

Some of the problems can be traced to low, hazy or overlapping standards for accreditation. In Illinois, for example, the elementary certificate, which is valid for grades K-9, requires only 7 hours of science and 5 hours of mathematics and can be used in place of a secondary science or mathematics certificate in grades 6-9. Nationwide, 45% of newly hired mathematics and science teachers were not subject-certified in 1980-81, and the figure rose to 50% the following year.

The problem of lack of incentives continues to plague teacher quality. Prospective teachers have been shown to score lower on the SAT than their peers headed for other fields. The ablest of those who do become teachers are often the first to leave the profession. A 1981 study of attrition rates of teachers in North Carolina indicated that two-thirds of the teachers who scored in the top 10 percent of the National Teacher Examination had left teaching within seven years.

The Federal Government has estimated that half the 2.1 million teachers in the nation's public schools will resign, retire or die in the next seven years. By 1992, according to the National Institute of Education, the demand for new teachers will outstrip the number of new teacher graduates by 34 percent (The New York Times, April 22, 1986).

HIGHER MATHEMATICS EDUCATION

The state of college mathematics is a direct consequence of the crisis in our school mathematics, which may be largely responsible for students' lack of interest in pursuing a career in the field. In 1980 only 1% of high school seniors named mathematics as their preferred field of study in college; two years later that figure had dropped to 0.7%.

In 1983 a total of only 12,557 Bachelors degrees in mathematics were awarded in the U.S., compared to 27,565 in 1970. We are thus slipping into a vicious circle. In no way can such a minuscule number of Bachelors satisfy the demand of science, engineering, industry, and education. Colleges are our essential training grounds for mathematics teachers; if they cannot produce more Bachelors in mathematics, there is little, if any, hope of alleviating the critical shortage of qualified mathematics teachers in our schools.

Since no more than 10% of Bachelors in mathematics go on to a Ph.D. in any field, the nation's production of mathematics Ph.D.'s and its pool of research mathematicians are also in real danger. America's production of B.A.'s and Ph.D.'s in mathematics, science and engineering does not begin to approach projected needs and this is, according to Erich Bloch, Director of the National Science Foundation, the result of "some twenty years of neglect of the science and engineering base" (B). Whether the United States is able to avoid further major shortages of personnel and equipment — and concomitant setbacks to its educational system and economy -- depends largely on the foresight and leadership of Congress and the authority and support given to the National Science Foundation.

On May 15, 1985, the Council of Scientific Society Presidents unanimously adopted the following resolution: "Mathematics, science and technology education are essential to the long range security and economic well-being of the nation. Therefore, the Council of Scientific Society Presidents commends those members of the Administration and Congress who have supported urgently needed funding for the National Science Foundation education budget."

The Current Condition of Collegiate Mathematics

Professor Lynn A. Steen, President of the Mathematical Association of America, describes the role of undergraduate mathematics in these terms:

> Undergraduate mathematics is a major education conduit for our nation's scientific personnel- not only for future engineers, physicists, and mathematicians, but also for computer scientists, statisticians, school teachers, physicians, economists, and business executives. Some type of undergraduate mathematics is required for virtually every scientific and engineering degree. Undergraduate mathematics is to scientific research what basic research is to applied science, the supplier of intellectual resources.

One cannot help agreeing with Professor Steen's assessment that our mathematics faculties are under great stress and increasingly unable to meet national needs in collegiate mathematics. For example, demand for undergraduate mathematics courses has doubled since 1970, but during that same period the nation's college mathematics faculty has increased by only about 50%. Each term about three million students receive mathematics instruction from about 30,000 faculty members. Despite this record demand for mathematics courses, the number of students majoring in mathematics has declined by over 50% and advanced (post-calculus) enrollments have declined from 20% to 5% of undergraduate mathematics. Indeed, approximately three quarters of all mathematics credits awarded by colleges and universities are for courses more appropriate to the secondary school curriculum. What's worse, about 100,000 workbooks are sold each year on the subject "Arithmetic for College Students."

Remedial, elementary and service courses drain faculty time and energy. Increased elementary enrollments combined with decreasing numbers of majors have simultaneously unbalanced the curriculum and depressed faculty morale, energy, and aspirations. In too many departments, the result is a downward spiral of withdrawn faculty, uninspired teaching, and uninterested students.

Inevitably, the availability of computers and the demand for new applications compels us to rethink priorities for mathematics education at all levels. To prepare students adequately for their careers in the twenty-first century, undergraduate mathematics programs must include core principles of computer science (algorithms, data structures, complexity theory); a contemporary view of numerical methods and approximation techniques; robust, computer-intensive statistical methods; graphical techniques for exploratory data analysis; and computer algorithms for optimization problems. This constellation of subjects is now widely known by the title "mathematical sciences," although the word "mathematics" is still often used as a short-hand synonym. The reality behind the name is both simple and awesome: undergraduate mathematics ought to be a totally different subject than it was twenty years ago.

"Unfortunately, in far too many departments, mathematics courses are dated both in spirit and in content -- primarily because faculty have not had sufficient opportunity for professional development. An active college mathematics curriculum should change half its courses every decade. For example, courses in mathematical logic, discrete mathematics, operations research, theory of computation, and combinatorics, although rare ten years ago, are now commonly offered by every good department of mathematical sciences. Creating these courses -- and their successors for the next decade -- is an essential but too often neglected part of the work of college faculties. The NSB Committee on Undergraduate Science and Engineering Education suggests that "the sensible way to accomplish curriculum changes is for a few colleges and universities to develop prototypical courses and instructional materials with support from a foundation such as NSF. These materials can then be tested, refined, disseminated for the benefit of all, and serve as templates for later commercial publishing."

Equally demanding and even more neglected are the challenges of providing mathematical courses appropriate for liberal education. For students in the arts and humanities, mathematics is an invisible culture — feared, avoided, and consequently misunderstood. Too often such students are forced to retake high school courses whose only purpose is to master skills that now can be performed far better by a computer. Illiteracy in mathematics breeds illiteracy in science and technology, thereby driving the two cultures even further apart.

In a society dominated by complex systems we need to do far more than we now do to convey to our society's future leaders — our present students — that mathematics is not magic, and that even those without advanced technical training need to know how to ask appropriate questions and demand responsible answers" (C).

The dependence of the Nation's science and engineering on the health of collegiate mathematics is by now unmistakable. In the first two years of college, a typical undergraduate science or engineering student takes as many courses in mathematics as in the chosen major. If the trends outlined above are not addressed immediately, America's science establishment could be moribund by the year 2000.

An Agenda for Action

On March 20, 1986, Dr. Homer A. Neal, Chairman of the Task Committee on Undergraduate Science and Engineering Education submitted its final report to Dr. Roland W. Schmitt, Chairman of the National Science Board. The document is a much needed analysis of undergraduate education in these areas and includes recommendations for major improvements. Dr. Neal wrote, "In this report we state our conviction that the National Science Foundation must both assume a leadership role and provide highly leveraged program support for undergraduate science, mathematics and engineering education in order to successfully meet critical needs that affect the health of the nation."

In full knowledge of the current federal budget exigencies, the Task Committee recommended the following funding levels and distribution of new funds:

		Recommended Funding Above FY 1987 Budget Estimates, Millions	
NSF Budget Estimate FY 1987		FY 1988	FY 1989
$13	Program (short title)	$50	$100
-	Laboratory development	10	20

2	Instrumentation	10	30
7	Faculty enhancement	10	13
-	Course and curriculum	7	13
-	Comprehensive improvement	-	10
4	Undergraduate research	8	8
-	Minority institutions	5	5
-	Planning	-	1

The report states, "Review of the appropriateness of support distribution across the disciplines and in other areas of special need should be a continuing concern of the Directorate for Science and Engineering Education."

Doctorates in Mathematics

Working conditions for academic mathematical scientists are becoming less attractive. While work loads have increased, salaries have decreased in real terms. For this and other reasons, the percentage of faculty Ph.D.'s is declining, and there is a growing reliance on part-time faculty.

In the 1970's the tight job market drove many students away from careers in mathematics teaching; now attractive offers from industry and computer science are doing the same. As a consequence, the age distribution of the mathematics faculty is heavily skewed towards the upper end: over three-quarters of the nation's mathematics faculty was educated in a pre-computer age. Despite the increasing demand for collegiate mathematics, too few new Ph.D.'s are in the pipeline for replacement positions. While the U.S. produced 1,236 Ph.D.'s in mathematics in 1970, in 1983 the number had dropped to 698. (NSF-SRS) The number of Masters degrees awarded in mathematics has also dropped by a factor of 2 from 5,648 in 1970 to 2,839 in 1983.

NSF Director Erich Bloch has stated that "The total number of doctorates awarded in mathematics, physics, and engineering does not come close to meeting the needs of the future, and is already falling short of national requirements for industry and academia. Moreover, an ever increasing proportion of those doctorates are awarded to foreign nationals.... The proportions in engineering and mathematics are especially high. We should be concerned about this degree of dependence on a resource that is not under our control."

At the Bachelor's and Master's level, the demand for mathematics graduates has never been greater. We all know of the serious national shortage of graduates who are adequately prepared to teach high school mathematics. What may not be so evident is the dramatic increase in demand from industry for students with Bachelor's or Master's degrees in the mathematical sciences to join teams dealing with computing, statistical or management issues.

Totally apart from education, the manpower needs of industry and defense are truly staggering. Supercomputer installations alone, estimated to reach about 200 per year by the early 1990s, will each require a dozen or so scientists capable of understanding and advancing research in scientific computing. Although these scientists will in many cases have advanced degrees in science, computer science, or engineering, all would need at least the equivalent of a good undergraduate major in mathematics. Just to support the needs of scientific computing, to say nothing of the needs of high school and college teaching, the United States will need to double the number of undergraduate mathematics majors. And as you know, the total population of college-age students will continue to decline for another ten years.

The nation is not being adequately served by current efforts to increase the number of women and minorities in the science and engineering workforce. Unless these efforts are maintained where they are effective and intensified where they are not, the nation will continue to deprive itself of an important source of future scientists and engineers to offset the decline in total number of new entrants expected between now and 1995. We need to tap the talents and interests of more women and minorities and let them know at an early stage that a career in science, mathematics, and engineering can be right for them.

In June 1984 the National Research Council's Ad Hoc Committee on Resources for the Mathematical Sciences produced a major report entitled Renewing U.S. Mathematics: Critical Resource for the Future. The report is having an enormous impact in the mathematical and scientific communities. Dr. Edward E. David, Jr. the Committee's Chairman, stated in his February 26, 1986 testimony before a House of Representatives subcommittee that "the Committee looked into the health of fundamental mathematics research in the United States... (and) found it in an alarming state."

Dr. David also focused on the need for across-the-board measures: "The full spectrum of mathematics education — from kindergarten through university — is of vital importance to the nation." The National Research Council established a Board on Mathematical Sciences and a Mathematical Sciences Education Board.

THE UNIVERSITY OF CHICAGO SCHOOL MATHEMATICS PROJECT

In view of the continued absence of detailed national guidelines for precollege mathematics achievement and the paucity of needed curriculum improvement and teacher training programs, I would like to report further on the work of the University of Chicago School Mathematics Project. It is especially appropriate to raise this matter at today's hearings on the National Science Foundation, for it was work done under the auspices of the NSF Directorate for Science and Engineering Education which served as the catalyst for this unique project. Mr. Richard M. Morrow, Chairman of the Board of the Standard Oil Company (Indiana), Dr. Keith W. McHenry, Jr., Vice-President for Research and Development at Amoco, and Mr. Donald G. Schroeter, Executive Director of the Amoco Foundation, have made this curriculum development and implementation program possible through their understanding of national issues and their exemplary commitment.

In response to the growing need for a mathematically literate public in a technological age, the University of Chicago School Mathematics Project (UCSMP) is developing a comprehensive program to upgrade mathematics education for the average American student. The program seeks to convey to students the essential role of mathematics in everyday life and to equip students to use mathematics effectively.

Begun in 1983, UCSMP is designated as a 6-year project. By 1989, UCSMP plans to have developed and tested a model school mathematics program for grades K-12 to serve as a prototype for reform in mathematics education. Major funding for the Project is contributed by the Amoco Foundation, which provided the full funding for the first 2 years of the Project. Beginning in 1985, the Carnegie Corporation of New York is funding a significant part of the development and evaluation of the secondary curriculum. Recently the National Science Foundation has contributed funding to the development and testing of the Elementary Teacher Development Program.

Recasting school mathematics for the 1990's and beyond presents many challenges. Prominent among these are revising the curriculum to incorporate advances in technology, expanding the curriculum to emphasize mathematics of contemporary importance, and increasing student proficiency, especially in problem solving. The UCSMP is distinctive in addressing these issues within a unified context. The Project viewpoint encompasses several dimensions. Not only are specific areas targeted for change, but the integration of the changes is of major concern.

Curriculum Development. To implement its goals, UCSMP is developing an elementary (K-6) curriculum and a secondary (7-12) curriculum. Common features of the curricula are:

—accelerating the teaching of geometry and algebra

1. algebra is introduced informally with the teaching of arithmetic in the elementary grades,

2. informal geometry is integrated throughout the elementary grades,
3. the 7th grade course, Transition Mathematics, is designed as a bridge between arithmetic and the formal study of geometry and algebra,
4. algebra and geometry are designed to be taught in the 8th and 9th grades, respectively.

—using calculators throughout the curriculum

1. four operation calculators with memory are used throughout grades K-6,
2. scientific calculators are used beginning in grade 7,

—teaching "newer" areas of mathematics

1. statistics and probability are taught informally in the elementary grades,
2. statistics and probability form an important component of the 8th grade Algebra course and are a focus of the 11th grade Pre-College Mathematics 1 course
3. discrete mathematics is a focus of the 12th grade Pre-College Mathematics 2 course.

—teaching mathematics with an applications orientation.
—utilizing microcomputers as an interactive tool to expand mathematics experiences beyond textbook presentations.
—using a cumulative review strategy to reinforce learning.

Elementary Teacher Development. Poor teacher preparation is often cited for the failure of past programs to reform school mathematics. A common postmortem to explain unfulfilled goals is that the program was never properly implemented in the classroom. UCSMP is designing a teacher development program which:

1. prepares K-3 teachers to teach a wider range of material than arithmetic and to integrate mathematics with other subjects,
2. trains math specialists to teach the math programs in grades 4-6, and
3. builds intra-school teacher networks to sustain professional development.

Foreign Resources. A noteworthy aspect of UCSMP efforts is a survey and translation of foreign mathematics education materials. These materials are an important resource for developing innovative materials and they highlight the disparities between American and foreign expectations of children's abilities to learn mathematics. It would seem that Americans have been overly pessimistic in their low expectations.

Organization, Staff and Current Activities

UCSMP is organized into five components and is staffed by professors from the Department of Mathematics, the Department of Education, and experienced classroom teachers.

The **Administrative Component** coordinates the activities of the other

four components and represents the Project as a whole.
Paul J. Sally, Jr., Director of UCSMP
Naomi D. Fischer, Associate Director

The **Elementary Component** develops the K-6 pilot curriculum and the elementary teacher development program.
Max Bell, Director of Teacher and Classroom Materials Development
Alan Hoffer, Director of Curriculum Pilot Project
Sheila Sconiers, Director of Teacher Development

K-6 Curriculum Development. Curriculum materials written for kindergarten, first grade and second grade are being pilot tested in 18 classes in 4 school districts.

Teacher Development. 73 teachers from 10 schools in Chicago Public School District 14 are participating in a program of monthly workshops and intraschool teacher networks. The student populations of 9 of the schools are 100% black, and the student population of the tenth school is 80% black. Some 2,250 students are in the classes of the participating teachers.

Teacher and Classroom Materials Development. Two sets of materials, Everyday Math, Kindergarten Level and Minute Math, Kindergarten Level are being pilot tested in 3 Chicago schools.

The **Secondary Component** develops the curriculum for grades 7-12.
Zalman Usiskin, Director

Secondary Grades (7-12) Activities. Transition Mathematics (Year 1), the first course in the secondary curriculum, is currently being used by about 4,000 students in 76 schools in 22 states and the District of Columbia. The text is designed for students who are at the 7th grade level in mathematics preparation on national tests. A planned large-scale summative evaluation of Transition Mathematics is in progress. 30 schools in 10 states (and about 2,000 students) are involved in the summative study. The first draft of the texts for Algebra (Year 2) and Advanced Geometry (Year 4) are presently being pilot tested in 7 and 5 schools respectively.

The **Resource Development Component** surveys foreign mathematics education resources, translates selected materials for use by UCSMP staff and maintains international contacts.
Izaak Wirszup, Director.

The Proceedings of the UCSMP International Conference on Mathematics Education will be published this year by the National Council of Teachers of Mathematics, the largest professional association of mathematics educators in the world, and will thus gain wide circulation in the United States and overseas.

The **Evaluation Component** monitors classroom and teacher activities to provide feedback to UCSMP staff and designs and executes experiments to provide statistical evidence of the effectiveness of UCSMP work.
Larry Hedges, co-Director
Susan Stodolsky, co-Director

Principal Investigators of UCSMP are Charles E. Bidwell and Izaak Wirszup.

It is hoped that the University of Chicago School Mathematics Project, which started as a partnership between the University of Chicago and the Amoco Foundation, will provide a model for the State of Illinois and the Nation. Whether its successes can be replicated in other disciplines or in other areas of the country depends in no small part on the resolve of Congress to sustain a strong NSF Directorate for Science and Engineering Education.

THE NSF DIRECTORATE FOR SCIENCE AND ENGINEERING EDUCATION

Thanks to this Committee's generous budgeting for fiscal year 1986, the National Science Foundation has further strengthened the work of its Directorate for Science and Engineering Education. The Directorate's leadership is now well established, and it is working closely with its active Advisory Committee. The staff has been supplemented by experienced university research scientists and college science educators. The Directorate enjoys the full support and cooperation of the NSF leadership and other NSF divisions. It can rely on the advice and guidance of the National Science Board, which is showing an ever-increasing commitment to education at all levels.

The Directorate has taken a very responsible approach to program development, striving for maximum benefits and accountability from the projects it supports. It has increased its efficiency in all aspects of its complex operations, and the quality of the proposals it receives is rising continuously. By utilizing the Foundation's and its own special strength of close relationships with academic institutions, the scientific community, and industry, the Directorate has been able to support creative ideas from around the country, and to award funding on the basis of quality and merit.

The Directorate has been especially successful in its aim of striking a balance between projects for instructional materials for high schools on one hand, and for elementary and middle schools on the other.

THE NATIONAL SCIENCE FOUNDATION

Programs of the NSF Directorate for Science and Engineering Education

1. Studies and Program Assessment

Precollege

2. Materials Development, Research and Informal Science Education
    a. Applications of Advanced Techniques
    b. Informal Science Education
    c. Instructional Materials Development
    d. Research in Teaching and Learning

3. Teacher Preparation and Enhancement
    a. Science and Mathematics Education Networks
    b. Teacher Enhancement
    c. Presidential Awards for Excellence in Science and Mathematics Teaching
    d. Teacher Preparation

Undergraduate

4. College Science Instrumentation
    Starting in fiscal year 1987 this office will expand to implement the recommendations by the National Science Board Task Committee on Undergraduate Science and Engineering Education.

Graduate

5. Research Career Development
    a. Graduate and Minority Graduate Fellowships
    b. NATO Postdoctoral Fellowships in Science
    c. Advanced Institute Travel Awards
    d. Presidential Young Investigator Awards

The Directorate is ready to undertake the new set of assignments from the National Science Board for radically improving American undergraduate science and engineering education. The new programs will be of vital importance to our colleges and have far-reaching effects on both precollege education and graduate programs.

My opinion, and that of many in the scientific and educational communities, is that the Directorate has amply fulfilled its promise and fully deserves the support it has requested for fiscal year 1987. This will be a year of crucial planning, development and expansion that will bring a new dimension and new responsibilities for science and engineering education at all levels. The Directorate is moving toward one of its major stated goals, namely "providing the nation's youth with a level of education in mathematics, science and technology that reflects the needs of the nation and is the highest quality attained anywhere in the world."

In this way the NSF Directorate can become a unique national repository of scientific strength, expertise, and education values. In short, the Directorate will become the most effective vehicle for a national mobilization for education.

I appeal to you, Senator Garn, and distinguished Senators of this Committee, to support fully the Directorate's proposed activities for fiscal year 1987.

APPENDIX I

SOURCES

A. **Collegiate Mathematics in the Year 2000: Assessment for Renewal.** Prepared by the Planning Committee for a National Study of Resources for Collegiate Mathematics. February, 1986.

B. **Current Issues in NSF Support for Research and Education** by Erich Bloch. January, 1986.

C. **Statement by Lynn Arthur Steen to the National Science Board.** November, 1985.

D. **Renewing Undergraduate Mathematics** by Lynn Arthur Steen. August, 1985.

E. **A Discussion of Issues for the National Study of Resources for Collegiate Mathematics.** Working Paper of Planning Committee. July, 1985.

F. **Indicators of Precollege Education in Science and Mathematics. A Preliminary Review.** Senta A. Raizen and Lyle V. Jones, editors. 1985.

G. **Final Report,** vol 1. National Science Board Committee on Undergraduate Science and Engineering Education. March, 1986.

H. **Making Do in the Classroom: A Report on the Misassignment of Teachers.** Council on Basic Education — American Federation of Teachers, AFL/CIO. 1985.

I. **IEA Second Study of Mathematics.** International Association for the Evaluation of Educational Achievement (Summary Report: United States), 1985.

J. **"Mathematics Achievement of Chinese, Japanese, and American Children."** (Stevenson, Lee, and Stigler), Science, 14 February 1986, vol. 231.

K. **Investing in Our Children.** Committee for Economic Development. 1985.

L. **Renewing U.S. Mathematics: Critical Resource for the Future,** National Academy Press, 1984.

APPENDIX II

Results of the Second International Mathematics Study

as published in the

Summary Report: United States (1985)

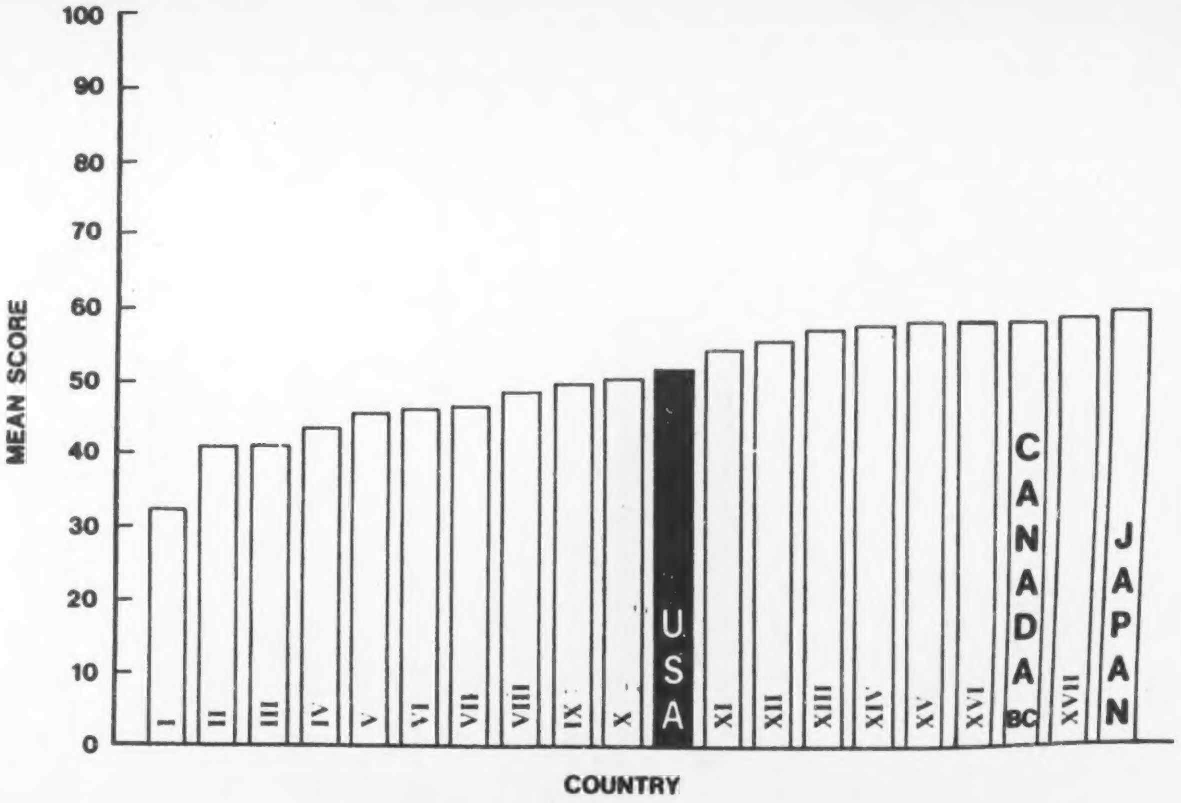


FIGURE 23 MEAN ACHIEVEMENT IN ARITHMETIC FOR POPULATION A (EIGHTH GRADE IN U.S.) FOR 20 COUNTRIES

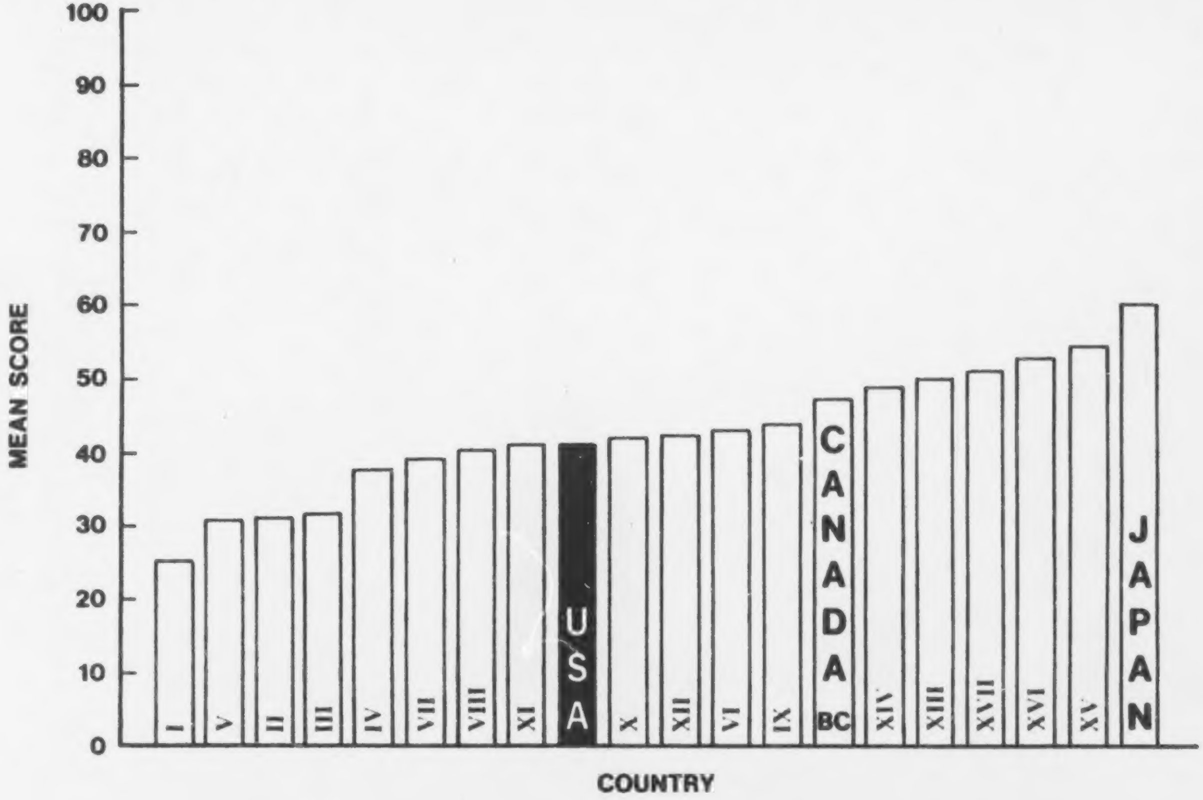


FIGURE 24 MEAN ACHIEVEMENT IN ALGEBRA FOR POPULATION A (EIGHTH GRADE IN U.S.) FOR 20 COUNTRIES

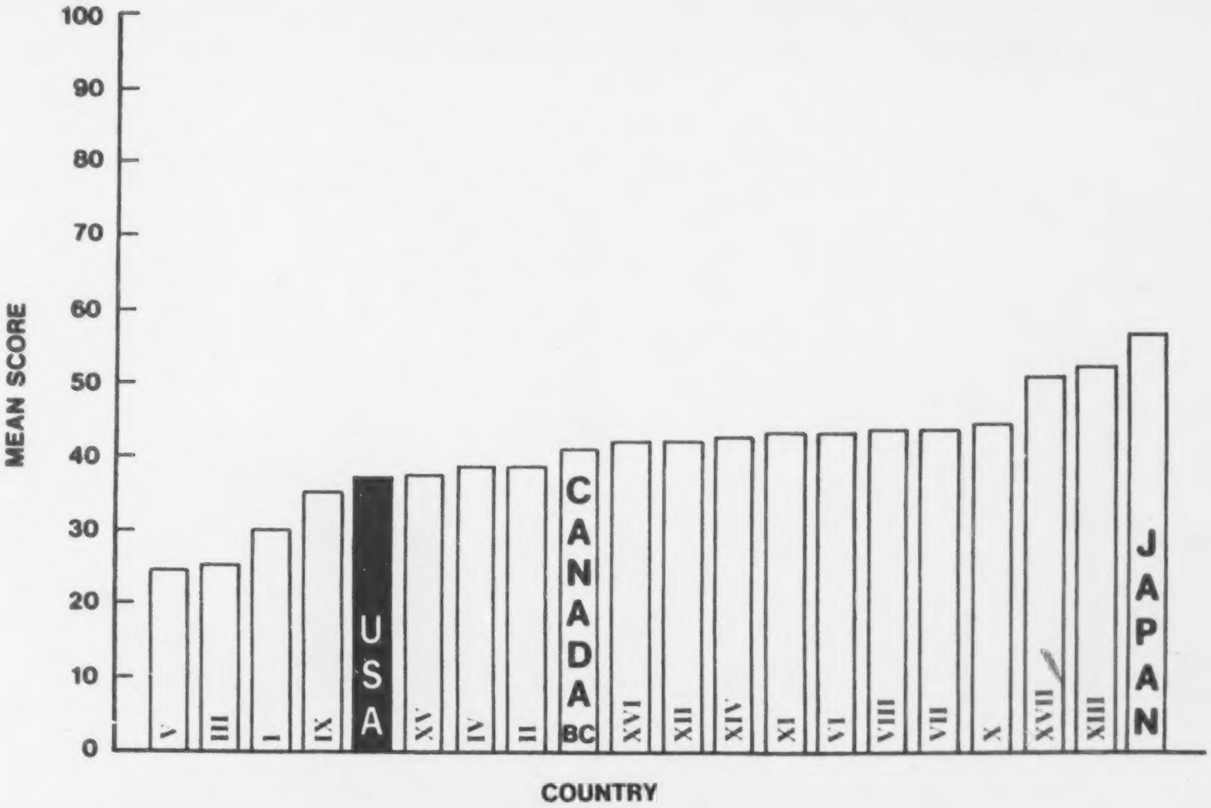


FIGURE 25 MEAN ACHIEVEMENT IN GEOMETRY FOR POPULATION A (EIGHTH GRADE IN U.S) FOR 20 COUNTRIES

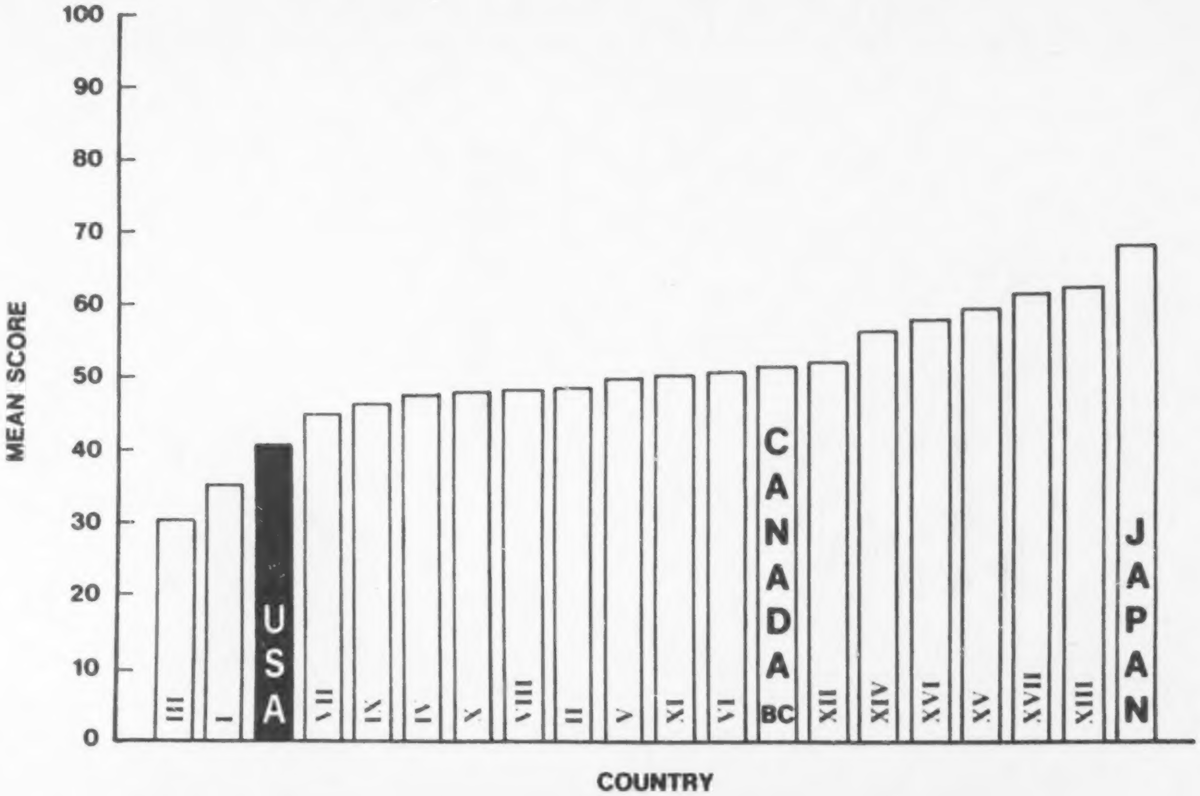


FIGURE 27 MEAN ACHIEVEMENT IN MEASUREMENT FOR POPULATION A (EIGHTH GRADE IN U. S.) FOR 20 COUNTRIES

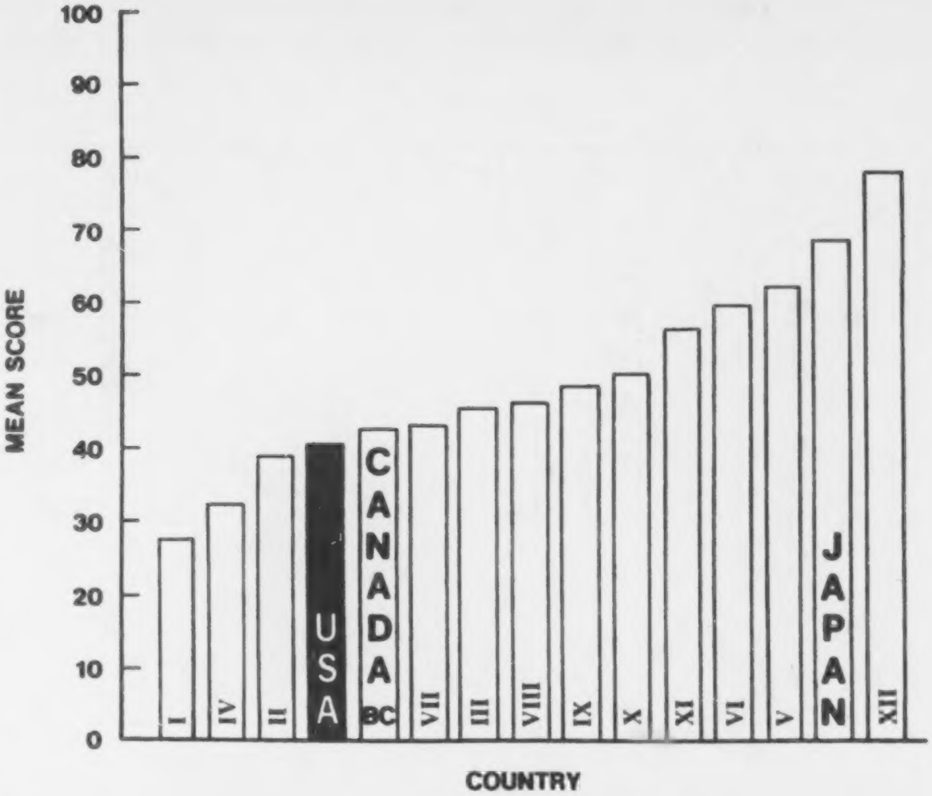


FIGURE 37 MEAN ACHIEVEMENT IN NUMBER SYSTEMS FOR POPULATION B (TWELFTH GRADE IN U.S.) FOR 15 COUNTRIES

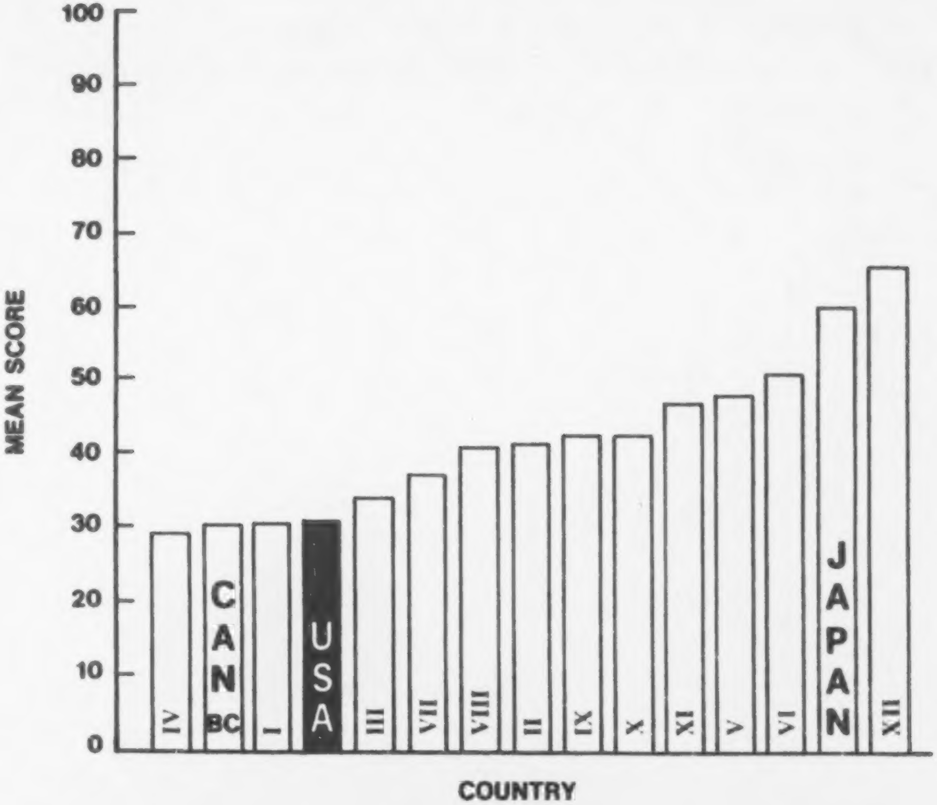


FIGURE 38 MEAN ACHIEVEMENT IN GEOMETRY FOR POPULATION B (TWELTH GRADE IN U.S.) FOR 15 COUNTRIES

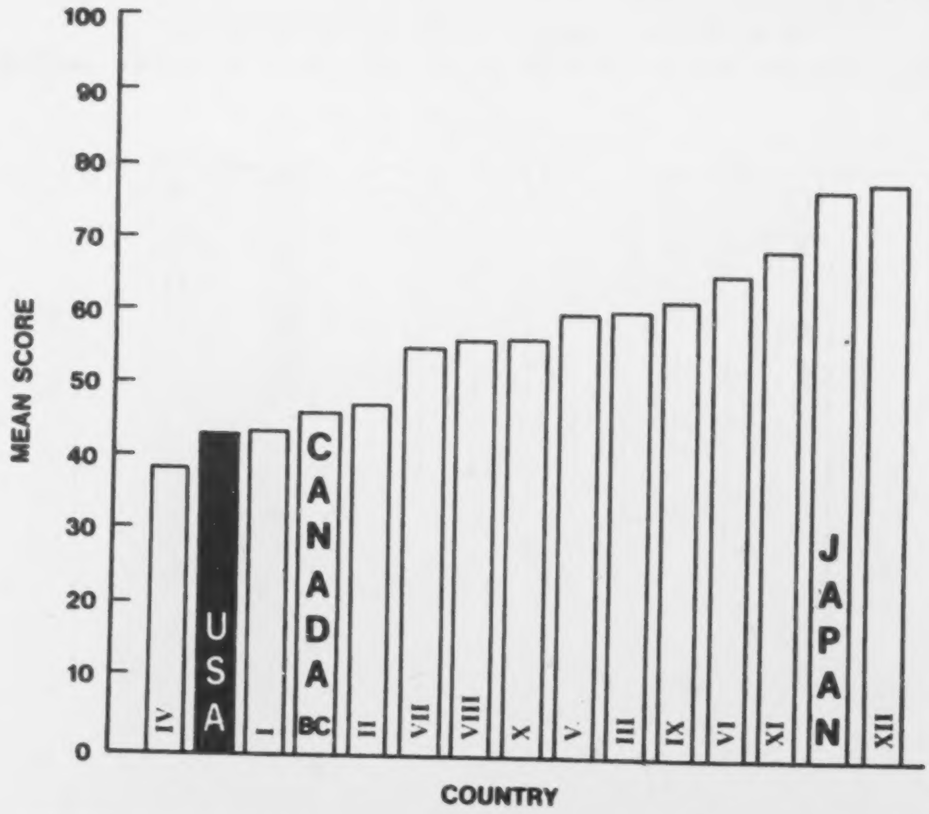


FIGURE 39 MEAN ACHIEVEMENT IN ALGEBRA FOR POPULATION B (TWELFTH GRADE IN U.S.) FOR 15 COUNTRIES

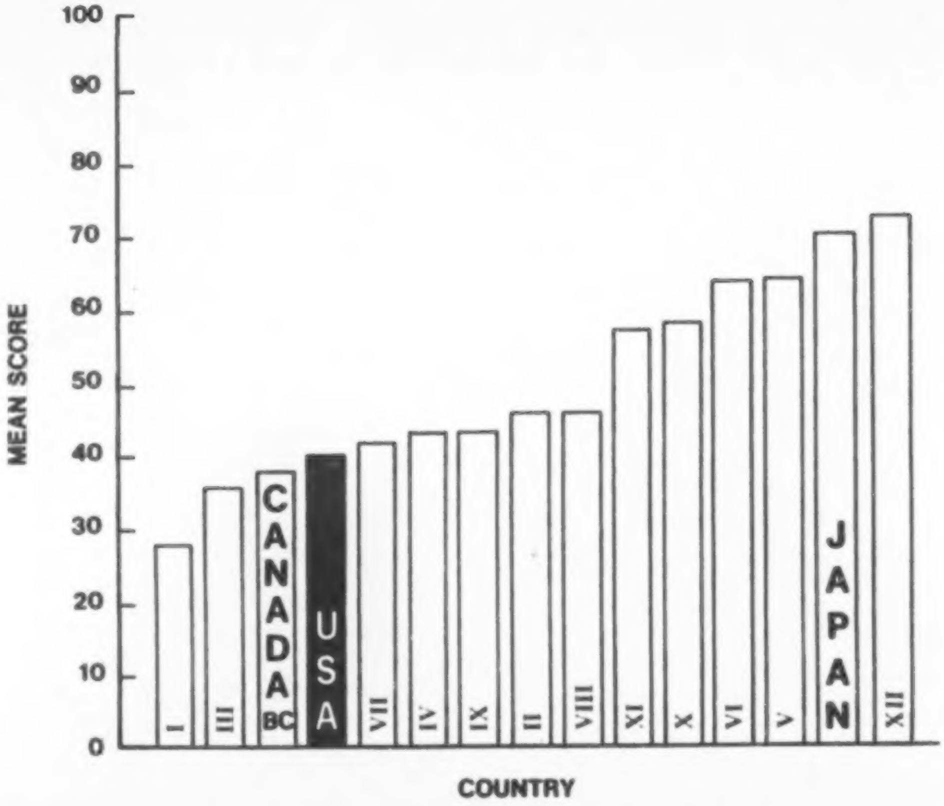


FIGURE 40 MEAN ACHIEVEMENT IN PROBABILITY AND STATISTICS FOR POPULATION B (TWELFTH GRADE IN U. S.) FOR 15 COUNTRIES

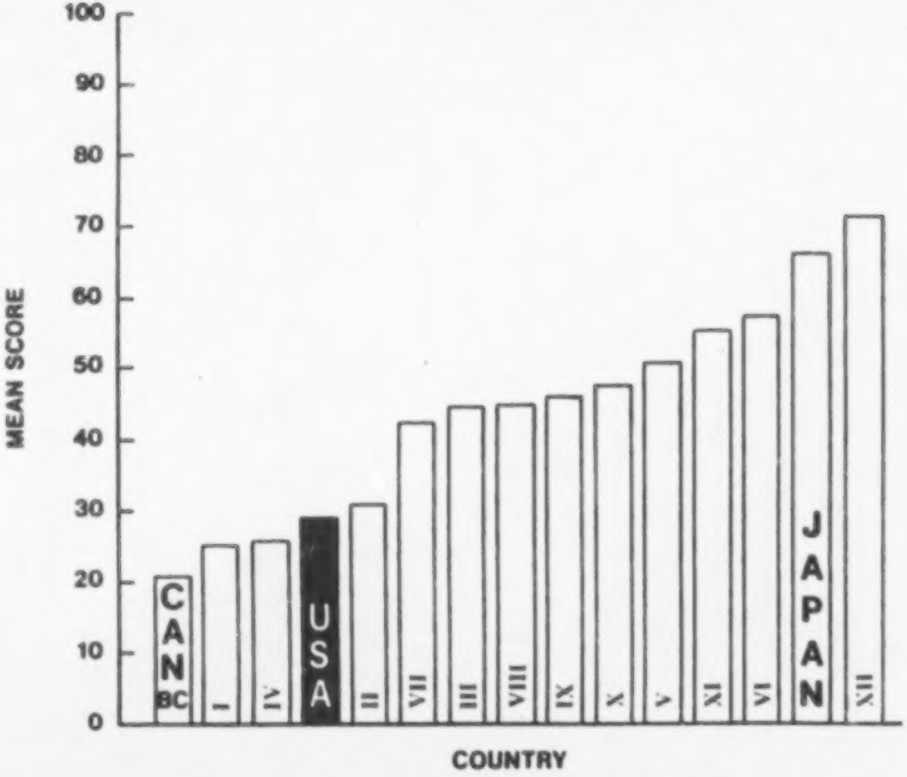
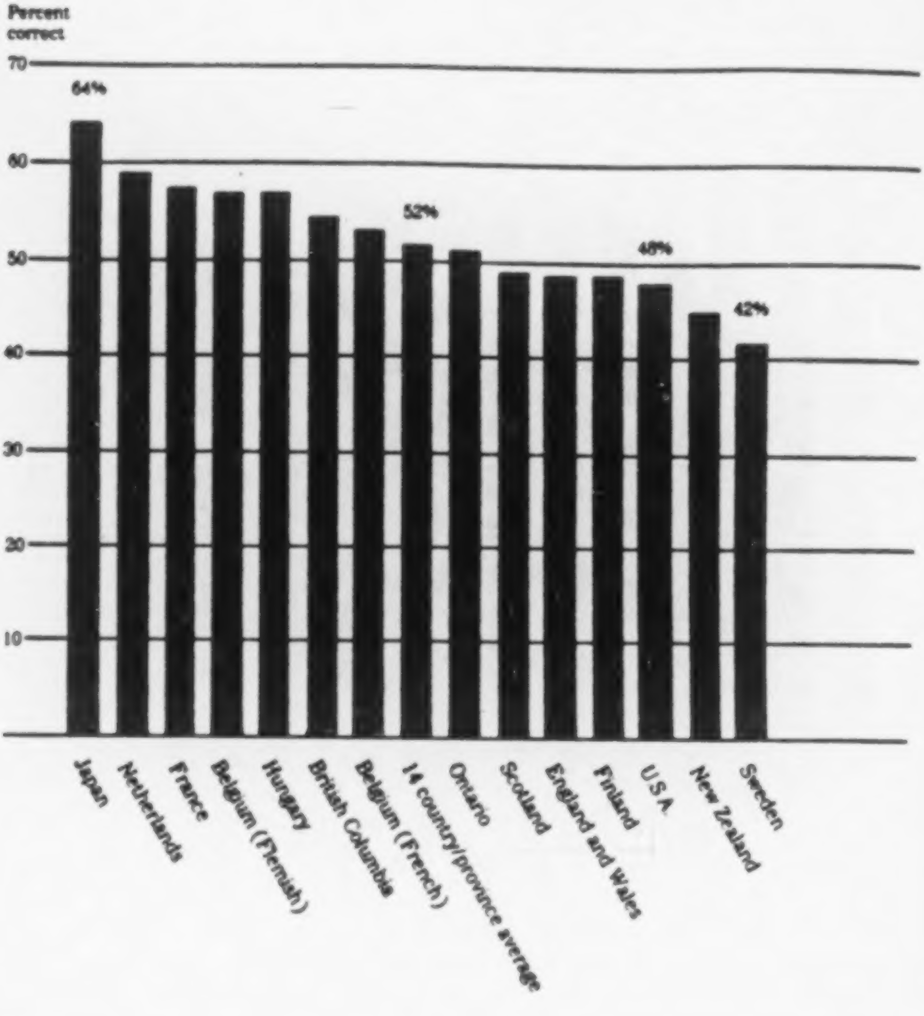


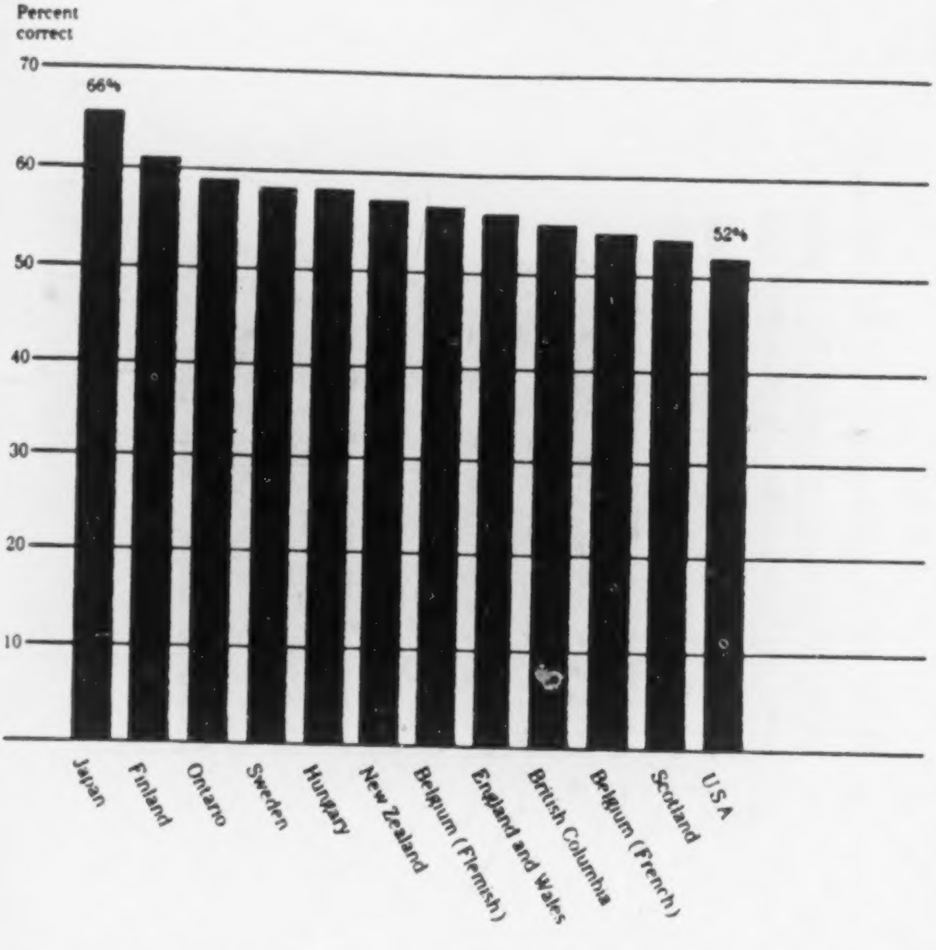
FIGURE 41 MEAN ACHIEVEMENT IN ELEMENTARY FUNCTIONS/CALCULUS FOR POPULATION B (TWELFTH GRADE IN U.S) FOR 15 COUNTRIES

Average Mathematics Score for Students in the Eighth Grade: 1981–82



SOURCE: U.S. Department of Education, National Center for Education Statistics (1986). *Second International Mathematics Study*

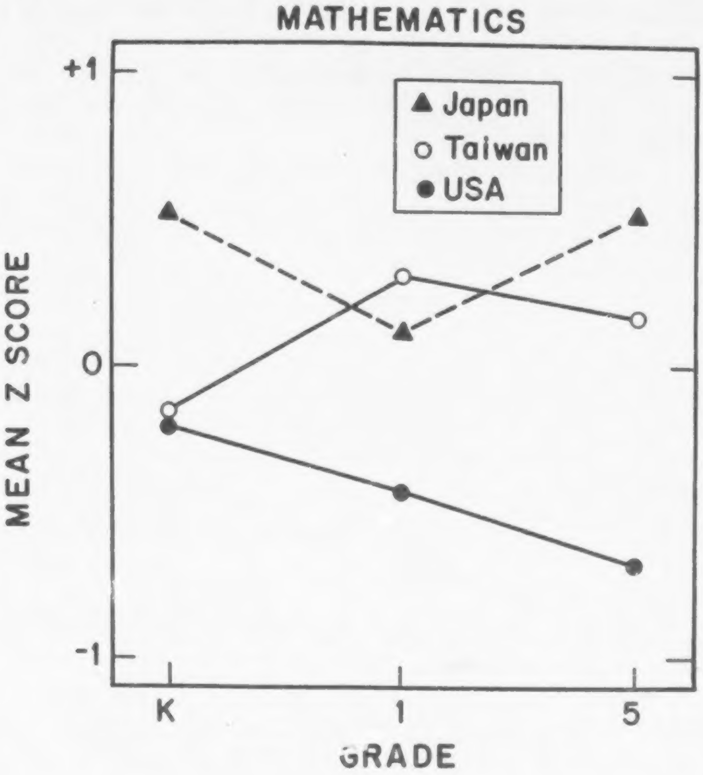
Score in Algebra and Calculus for Top 5 Percent of 12th Graders: 1981–82



SOURCE U.S. Department of Education, National Center for Education Statistics (1985). *Second International Mathematics Study*

APPENDIX III

Test results cited in "Mathematics Achievement of Chinese, Japanese, and American Children," (Stevenson, Lee, and Stigler) Science, vol. 231, February, 1986.



NATIONAL AERONAUTICS AND SPACE ADMINISTRTION

STATEMENT OF ALVIN V. BLOCK, PRESIDENT, ELECTROCHEMISTRY SEPARATION, INC.

Senator PROXMIRE. Our next witness is President Alvin Block, president of Electrochemistry Separations Analysis, Inc. We are happy to have you here, sir.

Mr. BLOCK. Mr. Chairman, and members of the committee, I am Alvin Block, president of ESA Biomedical Research and Manufacturing Corp. in Bedford, MA.

As the United States continues its thrust deep into space, manned flights grow longer in duration. So the long-term physical and mental well-being of the astronauts is critical. Effects such as motion sickness, anxiety due to isolation, and depression, the so-called sopite syndrome, are among the problems to be dealt with.

Scientists say that there is a link between the chemical makeup of the brain, more specifically in the pattern of its neurotransmitters and these disorders. These chemicals—the brain's switchboard—transmit messages and report on the state of the body. As the body starts to malfunction, it is reflected in the neurochemical patterns of the brain.

In order to detect and understand the pathology of such diseases, it is necessary to monitor these chemicals, to study their patterns, structure, and alignment.

CHEMISTRY OF THE BRAIN

Based on a new technology, our company, ESA, a pioneer in biomedical research has developed an instrument to do just that. In 1984, we built an instrument which, in effect, provides a window to the chemistry of the brain. By measuring and evaluating the behavior of neurochemicals, it is possible to develop a profile of a disorder and, more than that, to see how it differs from other disorders.

Of particular interest to this committee is the work done using ESA equipment by researchers at Ohio's Wright State University School of Medicine, in collaboration with NASA. They were able to distinguish between the neurochemical and biochemical differences of motion susceptible and nonsusceptible animals and to develop a pharmacological remedy. The remedy prevented motion sickness in two sets of studies. This promises a similar solution to human motion sickness, post-operative nausea, and nausea resulting from chemotherapy.

While the technology must be given far broader exposure, this instrument has so far enabled researchers to identify an abnormality in the neurotransmitters of Alzheimer's patients, to detect the possible manufacture by the body of neurotoxins in Huntington's disease; to discover neurochemical differences among several forms of severe pain; and to develop ways of measuring neurochemical patterns in depression and schizophrenia.

These studies are being conducted with a number of key medical research groups at Harvard Medical School, Massachusetts General Hospital, Boston University Medical Center, Bedford and Brockton

Veteran's Hospitals, and McLean Hospital, Belmont, MA, and are now proceeding at an increasingly rapid rate.

If the space program is to proceed and culminate in the establishment of space stations, this technology must be available to a wide spectrum of key uses. We ask the committee to ensure that budget cuts will in no way jeopardize this program and its promise of major medical progress.

We wish to thank NASA for their support.

Senator PROXMIRE. Thank you very much. This is a brilliant exposition of the practical effects on health of the space program that very, very few of us were aware of. I am in your debt for having spelled it out.

You asked that this element of the space program be particularly preserved because of the importance to health. Can you tell us, do you have any idea of how much is involved?

Mr. BLOCK. Our total funding so far from NASA has been probably $25,000. We have been putting mostly our money into it.

Senator PROXMIRE. Can you tell me how much, if any, Federal money has gone into it?

Mr. BLOCK. $25,000, and there is probably upward of $30,000 that has been held up coming out of NASA.

Senator PROXMIRE. Thank you for calling that to our attention. That kind of money, when you are dealing with millions and billions and trillions, is easy to forget, and if we forget it, in view of its remarkable and constructive contribution, would be a sad mistake. Thank you very much. We appreciate your testimony.

[The statement follows:]

STATEMENT OF ALVIN V. BLOCK, PRESIDENT, ESA, INC.

As the United States continues its thrust deep into space, manned flights grow longer in duration. So, the long-term physical and mental well-being of the astronauts is critical. Effects such as motion sickness, anxiety due to isolation, and depression, the so-called sopite syndrome, are among the problems to be dealt with.

Early indicators for these problems must be understood and tested with complex and sophisticated measuring systems. ESA has such equipment, already at work in the study of motion sickness.

Now this technology can be used to monitor depression and anxiety, a serious long-term disability that is extremely difficult to predict accurately.

ESA's ability to track the changes in the brain's chemistry developed from its study of degenerative diseases. Investigation of the correlation between brain chemical patterns and the pathology of Alzheimer's, Parkinson's and Huntington's diseases has also provided insights into schizophrenia and severe depression.

Scientists say that there is a link between the chemical makeup of the brain, more specifically in the pattern of its neurotransmitters and these disorders.

These chemicals - the brain's switchboard - transmit messages and report on the state of the body. As the body starts to malfunction, it is reflected in the neurochemical patterns of the brain.

In order to detect and to understand the pathology of such diseases, it is necessary to monitor these chemicals, to study their patterns, structure and alignment.

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We found that by measuring and evaluating the behavior of neurochemicals, it is possible to develop a profile of a disease and, more than that, to see how it differs from other diseases.

We have, in essence, discovered one way to provide a "blueprint" of a disease. Perhaps given time and further analysis, we will discover distinctions as fine as that of a fingerprint.

We are, however, a long way from that -- or from treatment or prevention of these diseases. Nevertheless, the body of scientific knowledge is greatly enriched and growing daily.

While the technology must be given far broader exposure, this instrument has so far enabled researchers to:

- identify an abnormality in the neurotransmitters of Alzheimer's patients;
- detect the possible manufacture, by the body, of neurotoxins in Huntington's disease;
- discover neurochemical differences among several forms of severe pain;
- develop ways of measuring neurochemical patterns in depression and schizophrenia.

These studies are being conducted with a number of key medical research groups at Harvard Medical School, Massachusetts General Hospital, Boston University Medical Center, Bedford and Brockton Veteran's Hospitals, and McLean Hospital, Belmont, Massachusetts and are now proceeding at an increasingly rapid rate.

Of particular interest to this committee is the work done using ESA equipment by researchers at Ohio's Wright State University School of Medicine, in collaboration with NASA. They were able to distinguish between the neurochemical and biochemical differences of motion susceptible and non-susceptible animals and to develop a pharmacological remedy. The remedy prevented motion sickness in two sets of studies. This promises a similar solution to human motion sickness, post-operative nausea, and nausea resulting from chemotherapy.

If the space program is to proceed and to culminate in the establishment of space stations, this technology must be available to key researchers. We ask the committee to ensure that budget cuts will in no way jeopardize this program and its promise of major medical progress.

STATEMENT OF JAMES L. HIEATT, CHAIRMAN-ELECT, SPACE SYSTEMS TECHNICAL COMMITTEE, ON BEHALF OF THE AMERICAN INSTITUTE OF AERONAUTICS AND ASTRONAUTICS

ACCOMPANIED BY DR. NORRIS KRONE, CHAIRMAN, AD HOC ADVISORY COMMITTEE ON NATIONAL AERONAUTICS

ASTRONAUTICS AND SCIENCE

Senator PROXMIRE. Our next witness is James L. Hieatt, chairman-elect of the Space Systems Technical Committee, and Dr. Norris Krone, chairman of the Ad Hoc Advisory Committee on National Aeronautics, on behalf of the American Institute of Aeronautics and Astronautics.

Mr. HIEATT. Senator Proxmire, the American Institute of Aeronautics and Astronautics would like to thank you for inviting in to express our opinions and views as you consider the NASA budget.

I am going to talk about the astronautics and the science portion of the budget, and Dr. Krone will discuss the aeronautics part.

One thing that I would like to mention is that AIAA was asked to prepare a report and did prepare a report and present it to the National Commission on Space. We have submitted that report to your committee for information because the general findings in that report, I think, substantiate the NASA budget. So it is relevant to the budget.

What I am going to do is to just briefly try to hit the high points, and then submit the testimony.

Senator PROXMIRE. I appreciate that very much.

STATEMENT HIGHLIGHTED

Mr. HIEATT. The first point that AIAA wants to make is that we feel that it is very important that the Nation retain a strong space transportation capability. We believe, to do that, we need to expeditiously replace the *Challenger*, to get our shuttle capability back in shape, and to go forward from there and broaden our space transportation capability in other areas using existing technology, and, at the same time, push for continued advancement in future technologies, such as the aerospace plan which Dr. Krone will talk about.

Just touching on the programs, we support the continuing development of the orbital maneuvering vehicle [OMV] because that is part of our general belief in a strong and vital space transportation capability.

We reaffirm our endorsement of the space station and we believe that we should go forward with that with a new start in 1987.

We were happy to see that the House authorization put back in the ACTS Program. We think that this is very important, supporting industry getting started in commercialization in areas where they can't really fund the technology at the level that is necessary.

In the area of space sciences and astronomy, we have identified two areas that we are very pleased to see in the budget. One is the Ocean Topography Experiment [TOPEX], and the other one is the fact that maintain support for our major on-going programs, that we didn't try to drop the programs out.

We identified several areas, and I will just touch on three, that gave us concern.

THREE AREAS OF CONCERN

One was the fact that we didn't commit to the full participation in the International Solar-Terrestrial Physics Program, which I think is important to our continued international cooperation in science.

We were also disappointed that there were no funds put in for the continuation of the Solar Telescope Program because the program has been initiated. A broader concern is that we still are not supporting research and analysis funds adequately to maintain the kind of support our science community needs.

We were very pleased to see that NASA did increase its moneys for the commercialization program.

That completes my summary, and I would like to turn it over to Dr. Krone.

Senator PROXMIRE. Thank you very much.

OK, Dr. Krone.

STATEMENT OF DR. KRONE

Dr. KRONE. I would like to make a couple of points relative to the aeronautics portion of the NASA budget very, very briefly.

First of all, we don't believe that that aeronautics budget is commensurate with the large potential market that is projected for the next 10 years of roughly $535 billion. In other words, we think of the aeronautics budget directly linked to our ability to capture that market, or at least a percentage of that market that we are used to.

That having been said, we do recognize the fact that there are heavy budget constraints and problems this year, Gramm-Rudman included.

Relative to the aerospace plan, we support that entirely based on the fact that we think that our long-term objective is to capture the long-term market. We don't think, at this point, that it should be considered a replacement for the shuttle, although some have discussed that.

There are a number of areas, scientific areas, we think that the NASA research and technology program is somewhat deficient in, including material sciences, propulsion, especially the hot section, and the ability to lower the cost of propulsion, and rotorcraft is another one.

That concludes my statement.

Senator PROXMIRE. Thank you very much. I am impressed by your testimony. Frankly, I am not quite as enthusiastic a champion of the space program as the chairman of the subcommittee is. As you know, he is Mr. Space in the Senate.

REPLACEMENT OF "CHALLENGER"

You advocate first that we replace the *Challenger* as soon as we can, that we expedite the replacement. What does that mean? How long will it take?

Mr. HIEATT. I think that the estimates are a couple of years for the replacement of the shuttle.

Senator Proxmire. How much will that cost?

Mr. Hieatt. I don't have the funding dollars. I think that NASA can supply those. I have heard estimates.

Senator Proxmire. I understand that the—staff tells me that it is about $3 billion, and they are hoping that by 1991 they will have it.

COST OVERRUNS

As you know, the projected costs in the space program have been way, way below the actual costs as they develop. It has been far more expensive than we expected. The orbiters cost about more than twice what we expected. The external tanks cost six times as much. When you extend all of these out, including the fact that the number of trips that the shuttle could take, and so forth, we find that the cost per payload pound was understated by twentyfold. It was estimated to be around $260, and it ended up being well over $5,000.

Why shouldn't we expect the same kind of performance in the future? I know that it is a new technology, and there is a learning curve, but they don't seem to learn much, except to learn how to push the cost up.

Mr. Hieatt. I am not sure that it is a fair question.

Senator Proxmire. If it is a fair question, it was asked from a prejudiced standpoint.

Mr. Hieatt. I think that NASA is attempting to come forward with a program where they have the opportunity to understand the costs before they proceed. In other words, to define a program where we are going to have at least 2 years of definition phase.

They have put forward a program where they are going to try and go forward with the design of the cost program, and this is the first time that NASA has ever tried to do that. So I think that we will have a much better confidence level of what the costs are going to be than they have had in some of the programs that I think you are referring to where there were overruns. NASA has performed on programs right on schedule and right on budget, but those just don't get publicized very often.

Senator Proxmire. My figures were for the overall, the cost per pound lifted into space.

Mr. Hieatt. I understand.

Senator Proxmire. Those were global figures.

You also asked for increases for research and analysis, as well as hardware, increases for commercialization, and then Dr. Krone asked for a substantial increase for the aeronautical part of it. This is Gramm-Rudman, and it is a tough time to give you those.

Mr. Hieatt. I understand. I feel strongly that the country and the populace, particularly, do not understand how badly we are underfunding our space program. There were some polls, and those polls show that the majority of the people thought that the space shuttle got 20 percent of the national budget, and as you know, it is seven-tenths of 1 percent.

Senator PROXMIRE. It is going to be much closer to 20 percent with star wars when it comes along. The estimate is that star wars is $3 trillion from the Secretary of Defense. Based on our experience, if we have the same kind of overruns, it will be a great deal more.

SPACE STATION

You are also asking for a space station. What is the cost of that?

Mr. HIEATT. The estimates that have come together are $8 billion for an initial operating capability.

Senator PROXMIRE. Let me ask you a little further. The initial operating capability at $8 billion, does it mean to get it out there, to produce it, move it into space, and so forth, including the research, will be $8 billion?

Mr. HIEATT. Yes; that is the process.

Senator PROXMIRE. How much will it cost to operate and maintain it annually?

Mr. HIEATT. I don't think that we know the answer to that, partly because we haven't fully defined operations yet.

Senator PROXMIRE. Why do we need a space station at this point?

Mr. HIEATT. That is a wonderful question, Senator.

Senator PROXMIRE. Give me a wonderful answer.

Mr. HIEATT. I will try. Michener said better than I could ever say it, and that is, "When a nation stops exploring, it starts decaying," and that is one of the few places that we have left to explore, if for no other reason, we ought to try to continue to explore it.

Senator PROXMIRE. It is a nice general statement, but I can think of a zillion areas we could explore. I am just substituting here today, because I am no longer a senior member of this particular subcommittee, but I am a ranking member of the Health and Human Services Subcommittee, and believe me there are all kinds of areas to explore there.

We had a fine witness on education, and we are going to have another one, Father Collins, that is another area where we have mountains to climb, and areas to explore to improve our operations. I think to say that this is one of the few areas that we have left to explore is space, or the only area, I think is a gross overstatement.

Mr. HIEATT. I didn't mean to imply that it was the only area.

Senator PROXMIRE. The last frontier.

Dr. KRONE. I won't go through the rhetoric, but the space program has really benefitted the general public in most areas, including health.

SPACE PROGRAM AHEAD OF TECHNOLOGY

Senator PROXMIRE. It has, there is no question that we ought to proceed with it. It is a question of how fast, and whether we are getting ahead of the technology. I think that we got way ahead of the technology with the SST, and I was one of those who shut it down. We didn't go ahead with it, and other countries did, and we find we are better off having done it.

I think that we got way ahead of the technology with the shuttle. I think that if we had gone ahead with unmanned, we would probably have done better. I think that it is not necessarily right to say, let's go ahead without recognizing that there is an alternative, and the alternative might be more productive.

I want to thank you, gentlemen, very much. You, obviously, are very expert in this area, and you have made a fine presentation.

Mr. HIEATT. Thank you very much.

[The statement follows:]

JOINT STATEMENT OF JAMES L. HIEATT, CHAIRMAN-ELECT, SPACE SYSTEMS TECHNICAL COMMITTEE, AND DR. NORRIS KRONE, CHAIRMAN, AD HOC ADVISORY COMMITTEE ON NATIONAL AERONAUTICS

Mr. Chairman, the American Institute of Aeronautics and Astronautics (AIAA) again thanks you for this opportunity to present its views as you consider the NASA budget for FY 1987. AIAA is a non-profit professional society dedicated to advancing the art, science, and technology of aeronautics and astronautics; and to nurturing and promoting the professionalism of those engaged in these pursuits. We have a membership of over 35,000, drawn from various levels of American industry, academia, and government as well as from numerous nations abroad.

Mr. Chairman, as responsible citizens, we recognize the need for constrained federal spending, but at the same time, we strongly believe that investment in NASA R&D significantly stimulates future economic growth - producing new industries, goods and services, and permanent jobs many times greater than the federal investment.

The AIAA recently prepared and presented a report to the National Commission on Space. This report addressed future directions for the U.S. civil space program and long range projection of technology. We have submitted this report for your information because it has relevance to the NASA budget.In summary, the NASA program as presented in the FY 1987 budget submittal supports in principal all the recommendations made by AIAA in that report to the National Commission on Space. Now I shall turn to the specifics of the NASA FY 1987 budget. Dr. Norris Krone will address the aeronautics budget.

SPACE TRANSPORTATION

The AIAA firmly believes it is essential that a sound, viable space transportation capability be maintained. Because access to space is so vital to our nation both for military and civilian purposes, our national launch capability must be expanded in breadth and depth so as to prevent a rare accident from bringing our space program to a standstill.

The expeditious acquisition of a replacement for Challenger is vital to support future needs and to provide a robust capability for both NASA and the DoD. In addition, the question of whether additional orbiters should be procured, and if so how many, must be addressed along with requirements for spare hardware and the consideration of alternative systems. While the space shuttle will remain a key element in our access to space, the current grounding of the shuttle fleet points up the need for an alternate launch capability. This in no way should be considered as critical of the space transportation system. Rather it is a realistic recognition of the fact that any complex system may develop problems which take time to correct.

In the same vein, we must point out the risk of having only one aircraft able to ferry orbiters back to Kennedy from other landing sites such as Edwards Air Force Base in California. We therefore recommend that NASA procure at least one additional ferry aircraft.

NASA must continue and extend its commitment to reducing the cost of transporting payloads to orbit. We must provide convenient and economical capability for both manned and unmanned payloads. For the near term, we should explore the technology now in hand. In the longer term, however, we must evaluate the development of new technology concepts such as the aerospace plane. Development tasks like this are a worthy use of our time and money, for even if, say, ten years from now, the practical realization of an aerospace plane still proves elusive, our research and development efforts in the meantime could well spin off benefits for other applications and compensate us many times over.

In summary, then, AIAA feels that once the problems that caused the Challenger tragedy are corrected we must move to reconstitute our shuttle capability, and, in the near term, to broaden and deepen our space transport capability with existing technology while looking toward a higher-technology future.

ORBITAL MANEUVERING VEHICLE

The AIAA supports continuing the development of the Orbital Maneuvering Vehicle (OMV). The OMV was a new start in FY 1986 after a number of years of careful study and preliminary design. NASA has properly planned this program and is prepared to select one flight hardware contractor this summer from the three Phase B contractors.

The OMV is needed in order to extend the shuttle's capabilities and relieve our temporarily short-handed shuttle fleet of some tasks that can best be accomplished with a small, remotely piloted vehicle. The OMV will improve the shuttle's efficiency by extending its reach by 1500 miles for the placement and retrieval of satellites. After the OMV is carried to orbit by the shuttle, it can remain there, stored on-orbit, waiting to be activated for its next mission by the ground operator. An OMV can be refueled on-orbit by simple module changeout to avoid unnecessary trips to the ground and back.

The AIAA sees OMV as a cost-effective vehicle that will play an important role in the evolving Space Station infrastructure. It will be used from the Shuttle, and will aid significantly in the assembly and operation of future space assets.

SPACE STATION

The AIAA reaffirms its endorsement of the Space Station program and strongly urges the initiation of a hardware start in 1987. The Space Station will provide the facilities necessary for expanding the commercial exploitation and scientific exploration of space and will help the United States maintain a strong technology base. As we testified last year, the most important commercial products, services and terrestrial technological advancements will probably be based on things we have yet to discover. However, operations and experiments on-board the shuttle already have provided valuable insight into the uses of a permanently manned facility.

We believe that a national commitment to an operational Space Station in the 1990s is an essential next step to the shuttle and that this commitment requires a plan for the program's sustained funding. Uncertain funding results in compromised capability and in significant cost overruns and delays. We further endorse the commitment to an initial capability for permanent manned presence. Although the concept of a man-tended Space Station may be well-intended, its implementation would reduce operational capability and efficiency and would signal a less-than-complete commitment to our objective.

The AIAA supports the concept of multi-national participation in the Space Station under U.S. leadership.

However, the U.S. Space Station program must retain responsibility for the key advances in technology. Further, the United States must retain responsibility for those elements of the Space Station which are necessary to encompass the basic mission configuration.

ACTS (ADVANCED COMMUNICATIONS TECHNOLOGY SATELLITE)

In FY 86, we applauded the foresighted action of Congress in initiating the ACTS program. Therefore, the AIAA strongly endorses the reinstatement of ACTS in the NASA budget and the rejection of the requested 1986 recision.

This program has measurable benefit to the taxpayer. It is estimated that revenue to the treasury from taxing operational ACTS technology will greatly exceed NASA's total investment in this area in constant dollars.

ACTS is a joint U.S. government-private industry program. Major investments have already been made by the private contractors. Altogether, approximately half the funds needed to complete the program have already been invested, including proof of concept technology development.

SPACE SCIENCES AND ASTRONOMY

In the 1987 NASA budget, we identified two particularly praiseworthy items:

1. A new start is planned for TOPEX, The Ocean Topography Experiment. This joint U.S./French program will provide valuable measurements of the surface topography and physical characteristics of the global oceans. Congress should approve TOPEX in NASA's FY 87 budget. This low risk/low cost program offers substantial benefits for research, fisheries, the shipping industries and improved ocean-related weather forecasting.
2. We commend NASA for its continued support of major flight programs that are under development (e.g., GRO, Magellan, UARS, MARS Observer) or in operation (Voyager, ICE, ISEE, ERBE, AMPTE, DE).

In the planned 1987 budget, we identified several items that were of concern:

1. The absence of a new start for full U.S. participation in the International Solar-Terrestrial Physics (ISTP) program is a major disappointment. For the past decade, this program has been ranked as the highest priority program for study of the Geospace environment by numerous committees of the NASA, the National Academy of Sciences and the international community.
2. The 1987 budget provides no funds for the continuation of the Solar Optical Telescope (SOT). Failure to continue this program is a major setback for solar physics research.
3. The lack of a new start for the Comet Rendezvous Asteroid Flyby (CRAF) project causes us concern. This year the Soviets, the European Space Agency, and the Japanese have flown spacecraft past Halley's comet and are thus be well ahead of the United States in cometary studies. The future of the U.S. planetary program depends in large part on the timely development of the next generation of planetary spacecraft.
4. The Explorer program development funding shows negligible growth, with the 1987 budget estimate of $56.7M only 2.7% greater than the 1986 budget estimate. In the absence of new starts for U.S. observatory spacecraft, the Explorer program is the principal means of conducting space science and astronomy research. The Explorer program needs to be substantially increased.

Furthermore, a separate line item should be established for the development of experiments-of-opportunity on spacecraft (such as NOAA, DoD, or foreign spacecraft) and for small payloads that are shuttle-launched (such as Spartan, Hitchhiker, and SPAS). For these small payloads, NASA has developed low cost carriers but no line-item to fund development and flight of this class of small payload.

5. There is negligible growth in research and analysis (R and A) funds for nearly all disciplines. The R and A budget is essential for fully exploiting space research.

We recommend that NASA follow up on the stunning successes of the Voyager mission by launching the Galileo Jupiter Orbiter and Probe as soon as possible, consistent with shuttle safety considerations.

COMMERCIAL PROGRAMS

Finally, Mr. Chairman, we are pleased to see that NASA is requesting a substantial increase for commercial programs, including Technology Utilization and the Commercial Use of Space. These programs are vital to the transfer of NASA technology to the private sector and to engaging the private sector directly in space research.

AERONAUTICAL R & T

For the last few years the AIAA has been expressing profound concern regarding the government's commitment to maintaining the U.S. as the dominant country in the field of aeronautics. Although the government resources allocated to the development of aeronautical technology have been considerable, it has been our position that the resource levels allocated to NASA were not commensurate with either the enormous free world aeronautics product market of the future, estimated to be approximately $535 billion dollars over the next ten years, or adequate for maintaining a strong lead in the critical military aircraft performance arena.

Although the FY87 NASA aeronautics program reflects a growing recognition of the importance of aeronautical Research and Technology to the health of the country, we believe the 8.0 percent portion of the NASA budget devoted to aeronautical R&T is insufficient to maintain to the U.S.'s world lead in aeronautics. However, the $22 million increase over the FY 86 R&D Technology budget level plus the $45 million programmed for the national aerospace plane (NASP) does certainly represent a step in the right direction.

Last year, hypersonic technology was one of five areas we recommended for additional emphasis. We also recommended research programs directed at flight research vehicles to verify design parameters and correlate ground based (analytical and wind tunnel) predictions. Therefore we support the renewal of the hypersonic flight regime research efforts.

The propulsion system is a critical key to the development of a useful aerospace plane. A scaled model of such a hydrogen burning propulsion unit was built and tested to Mach 7 at NASA Langley. This effort laid the foundation for the propulsion concept and therefore for the entire vehicle concept of the current aerospace plane program. The ability to build a practical aerospace plane also depends heavily on reducing the structural weight of the vehicle.

One major technical issue is the establishment of an adequate data base and overall validation of the design of the experimental manned transatmospheric research vehicle since the full scale vehicle cannot be ground tested through the full range of its operational flight speeds, Mach numbers and altitudes. It is recommended that a substantial effort be conducted as soon as feasible to define the facility needs with a high level of realism.

Military vehicle effectiveness is generally measured by its ability to defeat a projected enemy threat. Commercial vehicle effectiveness is almost always measured by its ability to compete economically with other vehicles that can meet the projected need. Hypersonic air breathing vehicles have the potential to meet both military and commercial requirements; however, it is likely that the military benefits in the form of a high speed reconnaissance, attack or interception aircraft will initially be shown as viable applications. A single or first stage of an advanced Space Transportation System (STS) is also a potential early use of the technology. The hypersonic transport aircraft application must meet more stringent safety and economic (total operations) constraints and is therefore considered a longer term applicaton which will probably depend upon the experience gained from earlier military or STS applications.

The nation's immediate, near and intermediate term need for a space transportation system (STS) should be totally uncoupled from the aerospace plane program. The aerospace plane is projected to be a more efficient STS; however, it must meet and overcome numerous technical challenges before it can be confidently substituted into the lineup. The aerospace plane technology should be pursued as the key to our long term dominance in world aeronautics, and the priority placed on it should be assigned in accordance with this goal.

The goals established by OSTP in March 1985 specified objectives in each of the three flight regimes--subsonic, supersonic and transatmospheric (hypersonic). The NASA support of the transatmospheric regime is clearly reflected in the FY87 program, however, we feel very strongly that the near term goals and specifically those programs associated with increased efficiency for subsonic and supersonic aircraft are inadequate. The technology required to reduce fuel consumption by a factor of two for subsonic aircraft is a realistic near term objective. One important key to accomplishing this would be the demonstration of practical techniques for maintaining laminar flow over the aircraft surface. A flight demonstration of a practical laminar flow design is needed. It is probable that there will be within 10 years an advanced operational transpacific supersonic transport with a range of five to six thousand miles and with ticket cost comparable with subsonic trasports. A reduction from 10 to 3 or 4 hours flight time from the U.S. to the Pacific basin will open an enormous new market that we should not ignore.

The national aeronautical goals cannot be met without a strong and vigorous technology base program. Therefore, we strongly recommend the strengthening of the NASA program in the areas of: (1) verification and correlation of computational aerodynamics codes, (2) engine hot section technology for increasing engine life and reducing maintenance costs, (3) advanced structures and materials (metals and composites) and (4) rotorcraft technologies.

In conclusion, the AIAA strongly supports the national aeronautical goals and the renewed interest in the hypersonic regime as indicated in the NASA FY 87 program. However, we believe the support of the near term subsonic and supersonic technologies is deficient and should be strengthened. We will be happy to answer any of your questions.

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PROJECTIONS OF SPACE SYSTEMS OPPORTUNITIES AND TECHNOLOGIES FOR THE 2000 TO 2030 TIME PERIOD

AN AD HOC COMMITTEE REPORT TO THE
AMERICAN INSTITUTE OF AERONAUTICS AND ASTRONAUTICS
FOR SUBMISSION TO THE
NATIONAL COMMISSION ON SPACE

19 November 1985

FOREWORD AND ACKNOWLEDGMENTS

The substance of this report is due to many contributions. It owes much to a previous AIAA report, Projected Space Technologies, Mission and Capabilities in the 2000-2020 Time Period. That report did not claim to set forth an AIAA consensus, and neither can this one. Indeed, because of time constraints, this report represents the work only of an AIAA Ad Hoc Committee and its recommendations to the AIAA as to what should be forwarded to the National Commission on Space. The views of the AIAA as a whole are to be expressed separately to the Commission by the AIAA Public Policy Committee.

Gratitude is due to the many people listed below, each of whom contributed text or comments or both. Special thanks go to Jean McDaniel of The Aerospace Corporation, without whose word processing skills in the face of short deadlines, we would have failed to get the first olive out of the bottle, so to speak.

The Chairman of the Ad Hoc Committee takes full responsibility for errors, opinions, and other inadequacies that may appear.

AIAA Ad Hoc Committee

Space Systems Technical Committee (TC-SS) representatives:

R. F. Carlisle
M. H. Dandridge
C. L. Durocher
J. S. Fordyce
W. B. Fouts
J. R. French
W. Graver
J. L. Hieatt
E. L. Heacock
D. R. Howard
S. Kulick
R. J. Lisowski
T. L. Moser
S. J. Paddack
F. Redd
H. Reichert
I. Singer
W. C. Snoddy
R. A. Stampfl
G. Walberg
J. Webster
D. Williams

TC-SS Alumni: I. Bekey, J. J. Florey, M. G. Wolfe

Representatives from other AIAA Technical Committees:

T. Andronikou, V. Chobotov (TC-ASD)
L. Caveny (TC-EP)
A. Crosbie, S. McAlees, C. Scott (TC-TP)
M. Cutchins, R. Gluck, J. Housner (TC-SD)
E. Gai, R. Williamson (TC-GN&C)
J. Heine, R. Stahl (TC-FT)
A. Kopania (TC-EC)
D. Lacer, J. Lotsof (TC-C3I)
G. Wade, R. McClellan (TC-SAT)
A. McDonald (TC-SR)
W. Morgan (TC-CMS)
C. Purvis (TC-PD)
W. Haynes (TC-LSS)
D. Rohrbaugh, D. Yoel (TC-SP)
S. Stack, R. Vassau (TC-ICG)
W. Taylor, A. Vampola (TC-SSA)
H. Wichmann, R. Burg (TC-LP)

Other contributors: B. Askins, B. Bejmuk, R. Broussard, R Chaky, A. Cohen, P. Glasser, H. Mayer, L. Manning, H. Mattson, L. McCreight, R. Neeland, E. Rechtin, S. Sadin, A. Saxena, J. Sercel, C. Stovitz, D. Spencer.

I. SUMMARY AND CONCLUSIONS

This is a report by an Ad Hoc Committee of the American Institute of Aeronautics and Astronautics (AIAA) to the AIAA for submittal to the National Commission on Space (NCS). Basically an update of a similar AIAA report prepared in 1980, its primary emphasis is on the fostering of the technology base that would be critical to possible civil space endeavors in the 2000-2030 time period. Accordingly, it notes the impact of technologically relevant events in the last five years, discusses future space system missions and opportunities, highlights critical technology developments, and points out desirable steps toward enhancing the technology base over the next few decades.

Events of the past five years have fundamentally impacted the outlook for the missions, the systems and, especially, the technology developments that may become integral to the Civil Space Program in the next 50 years. NASA and DoD have put into practice similar, highly mature techniques for planning and, in DoD's case, prioritizing advanced space technology programs. The Strategic Defense Initiative Program is sponsoring initiatives toward major advances in space technology that could benefit NASA as well as DoD. A National Space Strategy is being formulated to coordinate future military and civil activities. Meanwhile, however, concerns over the transfer of militarily critical technology have risen greatly and may conceivably disadvantage future efforts in the Civil Space Program.

Besides showing that the need to cut space transportation costs is still with us, the Shuttle has clearly demonstrated the economic and operational value of space crews. Appropriately, the U.S. has begun steps to establish a permanent manned presence in orbit. Aside from communications, the slower-than-expected evolution of space commercialization has raised issues on the government's future role in this area. At the same time, international competition in space has grown significantly while new opportunities for cooperation - including a renewal of joint U.S./U.S.S.R. endeavors such as an expedition to Mars - are emerging and being pursued. Lastly, the potential of space activities for enhancing global habitability is becoming increasingly recognized both here and abroad.

Against that background the range of system missions and opportunities for future civil space activities remains as wide and as challenging as ever, albeit with possible shifts in relative emphasis. For the near term, i.e., by 2000, major benefits to mankind from earth-oriented applications can be foreseen in (1) global communications between nations and especially to remote areas, (2) navigation and position fixing for commercial as well as search and rescue purposes, (3) earth observation particularly for environmental monitoring and forecasting, and (4) space manufacturing. Probes to the Moon, asteroids, planets and beyond would provide data essential for planning next steps.

Even more so for the infrastructure represented by the Space Station and the next-generation space transportation system and mission control. That infrastructure would enable many of the above applications. It would also contribute centrally to our knowledge of long-term human capabilities and durability in space, and give us the technological insight we shall need to design space vehicles for follow-on missions in the mid-term, say, 2000-2020.

Building on these near-term developments, a Lunar Base in the mid-term may be both technologically feasible and economically attractive, if its mineralogical yield proves sufficient to offset necessarily substantial investments in establishing and operating it. Beyond its intrinsic value, a Lunar Base would be useful to lay essential groundwork for the exploration and exploitation of the asteroids and Mars in the far term, i.e., 2030 and beyond, if not sooner. From the latter viewpoint, a Lunar Base would serve as a relatively convenient space technology center at which to develop the basic enabling technologies of planetary logistics, human support, mining and materials processing. Its payoffs as an international endeavor would also be worthwhile, the preparations for which having a possibly profound effect on the pace as well as the nature of the technological advances involved, not to mention subsequent goals for the far term. Thus, a Lunar Base would seem to be a logical next step in technological development for the Civil Space Program.

From the standpoint of future technology, a manned base, or perhaps more accurately, a colony on Mars would represent a watershed. The effort to get there in the first place, much more to establish a viable resident operation, implies major technological advances that shall have had to be achieved in the near- and mid-term time periods. It would be surprising if, in the meantime, those advances had not already begun yielding substantial benefits to mankind - possibly enough by themselves to have justified the whole endeavor. It would be equally surprising if, by the time Martian operations become routine, new technological imperatives did not result.

From a current perspective on the above missions and opportunities, the technology advances that will be most needed in the direct pursuit of long-term human presence in space, are those related to human support. This includes its psychological and societal as well as its physiological aspects. For manned or unmanned missions, companion progress will also be needed in the related fields of information processing and of autonomy and automation, including robotics, artificial intelligence and the proper balance of man and machine. This is not to say that other advances are not also important to foster in our space technology base, i.e., advanced in sensing, communications, propulsion, power, structures, material, thermal management, manufacturing, etc. Rather it is to emphasize that the productive survival of the payload - in this case man - is of greater importance than that of the supporting elements, and that we likely know less about the technology of man than we need to know.

Recognizing that we are speaking of the development of our technology base over a period of at least two generations, it is pertinent to emphasize one other vital element of that base, namely, education and training. The scientists, engineers and space travellers who will participate directly in the colonization of Mars are likely not to have been born yet. By the time they receive their education and training, say, in the 2010-2020 time period, it is imperative that its quality and content at both the high school and college level be fit for the challenge at hand.

II. INTRODUCTION

A. BACKGROUND AND IMPETUS

This report is in partial response to a request made to the AIAA in mid-July 1985 by Dr. Thomas O. Paine, Chairman of the National Commission on Space (NCS) for a projection of space systems opportunities and technology for the 2000-2030 time period. The AIAA in turn requested its Technical Advisory Committee and, in particular, its Technical Committee on Space Systems (TC-SS), to form an Ad Hoc Committee to draft the report.

The NCS was established by the President (1)* in October 1984 to study existing and proposed U.S. space activities; formulate an agenda for the U.S. Civil Space Program; and identify long-range goals, opportunities, and policy options for civil space activity for the next 20 years, i.e., to 2005.

In 1980, also in response to a request by Dr. Paine, the AIAA prepared a similar projection, i.e., the so-called 2020 Report (2). It was for use in a study of potential space power and energy applications being conducted by Dr. Paine for the National Academy of Sciences (NAS).

Only five years have passed since the 2020 Report was prepared. Yet many things have happened in the meantime, and their possible significance for this report will be noted in the next section. Nevertheless, much that the 2020 Report contains is still valid. This report will therefore build on that report and focus on newly emerging aspects that the AIAA Ad Hoc Committee sees as worth noting.

B. THEME, PURPOSE AND SCOPE

The theme of this report is basically the same as that voiced by the AIAA in its recent position paper on ballistic missile defense (3), namely, that the United States must maintain a broad base of space technology and thereby foster its future options in space.

The primary purpose of this report, taken in concert with the 2020 Report, is therefore to highlight critical space-related technologies, the development of which merits attention, in the view of the AIAA Ad Hoc Committee (ACH).

The scope of this report is confined primarily to space technology, including science and engineering. Technology, however, is broadly defined to be the means of improving human welfare. Moreover, while a future space system concept worth acquiring must be shown to be technologically feasible, it must also make sense economically, operationally, politically, institutionally, environmentally, and so on.

While concentrating on technology, therefore, this report will not ignore salient aspects of other factors that the AIAA AHC feels the NCS should consider. Indeed, the next section cites nine of those factors.

With respect to one of them, the Strategic Defense Initiative (SDI) Program, the NCS asked the AIAA to comment in this report on the sensitivity of civil-oriented space technology developments to related developments in the SDI Program, especially with regard to changes in the latter in either direction. This has been done by the AHC at appropriate places throughout the report.

Lastly, the NCS has also invited the AIAA's views on directions that the Civil Space Program should take for the future. At this writing these views are planned to be submitted under separate cover.

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*Reference numbers are given in parentheses.

III. RELEVANT DEVELOPMENTS: 1980-1985

Since the 2020 Report, developments in at least nine areas have taken place, which in the view of the AIAA Ad Hoc Committee (AHC), must be factored into any study of the future of the Civil Space Program.

A. NASA AND DOD SPACE SYSTEM TECHNOLOGY PLANNING

Unlike the situation in 1980, space system technology planning at NASA and DOD has reached a highly mature and sophisticated state. This includes extensive cooperation between the two agencies, both formally and in a de facto sense through the AIAA.

As of January 1985, for example, through their Space Technology Interdependency Group (STIG), NASA and DOD have a total of 117 projects underway in advanced technology development, with a total combined funding of over $260 million (12).

Within DOD, the Air Force, in 1979 established the Military Space System Technology Plan (MSSTP)(4). Now in its third edition, with the fourth in preparation, the MSSTP develops a traceable rationale starting with present and possible future missions and then postulating requirements and system concepts to meet them. The concepts, in turn, are then examined to identify critical technologies. These are compared with technology projections (currently out to 2000) to spot prospective deficiencies and thereby build and prioritize cost-constrained development roadmaps, for use in the budgetary process. The Air Force's Space Command, as well as its Systems Command, take direct parts in shaping the MSSTP.

Although somewhat less formally so, NASA's Space System Technology Model (SSTM) (5), which led to the MSSTP, is prepared along much the same lines. The MSSTP and the SSTM have much in common not only because of the cooperation mentioned above, but also because the first edition of the MSSTP in 1981 originated at NASA's suggestion from their early work on the SSTM. Another factor promoting mutual consistency is the help given by the AIAA. Since 1980, much work by AIAA members in NASA, DOD, and industry, has gone into assuring the technological excellence of both the MSSTP and SSTM. The AIAA AHC commends both the MSSTP and SSTM to the NCS as valuable references.

B. THE STRATEGIC DEFENSE INITIATIVE (SDI)

The overall purpose and detailed structure of the SDI program (SDIP) are public knowledge (6). Clearly, the SDIP could have major long-term implications for future space systems and technology developments, as Reference 3 points out.

To cite several areas of impact on the Civil Space Program which the AIAA AHC feels the NCS should consider:

1. Much higher levels of onboard data and information processing, i.e., in the gigabit range, and large scale internetting of satellites and ground elements, along with extreme reliability of both hardware and software. The SDIP is likely to force-feed the efficient creation of massive and easily-validated software packages, the development and implementation of very large hybrid simulations, and the effective matching of human capabilities to the command, control and communications requirements of very large distributed systems, including use of so-called artificial intelligence. The SDIP requires these capabilities for robust and survivable battle management and command, control, communications, and intelligence (C^3I) systems. For the Civil Space Program similar capabilities in communications and information processing technologies may be needed eventually to support full-scale manned exploration and utilization of the planets.

2. The SDIP necessarily puts great stress on survivability techniques, particularly in terms of nuclear conflicts and attacks by nuclear, non-nuclear and directed energy weapons. Such stress is not without relevance to the Civil Space Program. For one thing, radiation is a hazard to humans in

either case, although the techniques of survivability may differ. Even so, a long-term space crew, whether military or civilian, must contend with similar problems. Another common problem is the possibility that by 2030, an antisatellite (ASAT) capability or a capability to deliver nuclear weapons to space, will be far more generally available than it is today. Recognition of this possibility as well as the current growth of terroristic thinking suggests by itself that the Civil Space Program must incorporate survivability to a realistic and prudent extent. Indeed, National Space Policy (7) has long stressed the need for survivability in the National Security Space Program. The extension to the Civil Space Program is a logical one, particularly for those civilian satellites (e.g., communication satellites) that may be required to survive in a nuclear environment. In such cases, it is reasonable to expect that the requirement would be accompanied by appropriate governmental support, both technological and economic.

3. The SDIP requires advanced space-based sensors including long-wave infrared sensors, millimeter-wave radars and laser imagers. Its requirements are predicated on having to have relatively exact information about a large number (approximately tens of thousands) of objects in space in a short time. The traffic requirements for the SDIP would certainly seem to be far more stringent than for the Civil Space Program, but the needs for the basic sensor capabilities involved might well be similar.

4. SDIP interest in high-power directed energy and kinetic energy weaponry naturally extends to areas of supporting technology of importance to the Civil Space Program. Examples include large, rugged optics; precise stable pointing and tracking; advanced propulsion techniques for small payloads; and large amounts of space power and energy.

5. Complex large space structures are of common concern to the SDIP and the Civil Space Program. Both are interested in technologies and techniques to accomplish economically the research, development, test and evaluation of large structures on orbit, including their construction, control and survivability.

6. Of common interest as well is on-orbit maintenance and repair, including autonomy, automation and robotics as well as aids to the detection and negation of potential threats such as orbital debris or, from the standpoint of security and survivability, space mines or orbital bombardment satellites. To both programs, and especially to the SDIP, it may be important to be able to determine quickly the difference between an attack and an accident and to assess the damage involved along with the need for repair and rescue.

7. Both the SDIP and the Civil Space Program are faced with the demands for a higher rate, heavier-lift launch capability and for greatly improved cost effectiveness of launch systems and operations on Earth and in orbit.

8. Most fundamentally of all, perhaps, realism in shaping our future Civil Space Program demands that we consider the priorities of the taxpayer in supporting space-related programs. Developments that lead to increased national security and tangible societal benefits are likely to receive more lasting public support than developments toward an objective adopted simply "because it is there." It can be argued that taxpayers may be far more willing than otherwise to fund, for example, the manned exploration of Mars if it can be done with the wherewithal already developed for other purposes. If our children explore Mars, much of the technology they use may likely owe its existence to efforts such as the SDIP. From that point of view, perhaps boldness in laying out our future Civil Space Program resides not so much in describing its future goals and objectives as it does in inventing durable techniques for achieving them.

C. NATIONAL SPACE STRATEGY

Besides the developments just discussed and the establishment of the NCS, perhaps no other event since 1980 is more likely to influence the implementation of the future course of the Civil Space program than the National Space Strategy (8). It covers the Space Transportation System and requires a joint DOD-NASA study on post-1985 launch vehicle technology. It also covers the Civil Space Program, including the Space Station and the recommendations of the NCS; scientific research and exploration; commercial space activities; and national security space programs, such as the SDIP.

Technology needs derive from analysis of future missions and system opportunities to perform those missions. In this respect, the National Space Strategy effort will, by early 1986, go far toward providing a valuable, authoritative and detailed benchmark. At this point in time, therefore, the AIAA AHC has elected only to highlight what it views as the critical space-related technologies to pursue.

D. TECHNOLOGY TRANSFER CONCERNS

Technology transfer concerns have risen dramatically since the 2020 Report, and have already had a corresponding effect on heretofore relatively free technological interchange--a mechanism essential to the nurturing of a strong base of space technology. Within recent months, DOD procedures for restricting release of unclassified technical information derived from DOD-sponsored research and development, have begun to crystallize.

How soon NASA may have to institute parallel procedures is moot. That NASA will have to do so eventually seems certain in light of the already cited overlap of DOD and NASA interests in space technology and its development. The cases of the SDIP and of joint DOD-NASA efforts to define post-1995 launch vehicle technology have been noted above. In the NASA-DOD Interdependency Program (12), DOD sponsors wholly or in part certain space technology development programs of mutual interest as, for instance, in space communications related to NASA's Advanced Communications Technology Satellite (ACTS) program. Since DOD does the sponsoring, then does it also have the right to restrict the release of unclassified NASA information derived through such sponsorship?

The AIAA has already voiced its opposition to limitations on the transfer of unclassifed technical information. In particular, where NASA and DOD interests overlap, the Ad Hoc Committee sees the real danger that the technology base essential to a vigorous and open-ended Civil Space Program will be seriously eroded to the detriment of the nation. In that light, it is no longer clear that the AIAA or any other professional society will in the future be able to respond to requests such as for this report, without having to put their reports through an extensive and inevitably stifling review process.

E. THE SHUTTLE EXPERIENCE

Unlike the situation in 1980, we now have a great deal of practical experience with the Shuttle and its operation.

On the dark side, space transportation costs have turned out to be much higher than predicted, especially in light of early speculations on prospective savings from reusability. Apparently due to the expense involved, higher risks of disablement than otherwise have been taken. Two examples are that no fifth Orbiter is planned, and that only one Orbiter ferry aircraft exists. In addition, we now know that we have much more to learn about human health in orbit, more about which will be discussed later.

On the bright side, we have learned how useful the crew can be in space, especially with regard to handling the unexpected and compensating for costly human errors on earth. Building in a flight crew builds in a needed measure of forgiveness, which may be essential to the success of our future in space. These lessons are reshaping our perceptions of critical technologies in several areas, especially in that of human support, including life sciences.

F. THE COMMITMENT TO A PERMANENT MANNED PRESENCE IN ORBIT

In addition to the technology of human support, the Administration's commitment to a permanent manned presence in orbit has concentrated attention on such areas as large structures, space transportation, autonomy, automation and robotics. Problems identified in the 2020 Report are still with us today, and others have come into somewhat clearer perspective. The difference is that a more focused developmental effort has begun as a consequence of both the SDIP and the space station commitment. For example, at an official level within NASA, the idea of a space station has been present since at least the period immediately following the Apollo 11 landing. Yet, only very recently, in September 1985, has there appeared the first comprehensive overview and assessment of automation and robotics in relation to the space station and, quite appropriately, the U.S. economy as well (9).

We can safely anticipate that as more commitments are made, more areas of technological concern--including some not anticipated in this report--will emerge and begin to be clarified.

G. SPACE COMMERCIALIZATION

The 2020 Report, for present purposes, adequately outlines the potential for space commercialization well into the next century and, at the rate things are going, possibly beyond. In the last five years, events have pointed up the need to resolve certain difficulties that have emerged. As Grey (11) points out, one set of difficulties is financial. To be sure, the satellite communications market is long since well established and projected to grow annually between 20 and 30 percent to the $30 to $100 billion level by the year 2000. A comparably large long-term potential return seems to lie in the processing of certain materials in space for which the value added per unit mass more than pays for the increasingly high cost of space transportation and orbital operations. But beyond these areas, as for example in space transportation and remote sensing, the absence of a sufficient near-term return on investment threatens to dampen investor enthusiasm.

In this regard, a key question for the Civil Space Program concerns the proper role of the government in the financial end. Similarly, what is its proper role with regard to advanced technology developments conducive to space commercialization, especially if proprietary rights or applicability to national security may become an issue?

More fundamentally, to what extent might the government's posture on space commercialization work to transfer not just technology but, even more importantly, the initiative for advancements in space technology outside the U.S.? In the view of the AIAA AHC, the Civil Space Program should be so configured as to minimize such transfers of initiatives.

H. INTERNATIONAL COOPERATION AND COMPETITION

The recent Office of Technology Assessment report (10) in this area sums up the situation quite well. Since the 2020 Report, it has become quite evident that the U.S. no longer has a monopoly on advanced space technology in the West and, indeed, may yet find itself in a secondary position. A basic question is, therefore, whose space technology base must the U.S. act to preserve? Put differently, should we in effect count on another nation to develop the technology we may find ourselves in need of? Or, better still, how can we best join forces, as in the Space Station Program, to promote space--and the technology that goes with it--for the benefit of all mankind.

This AIAA report, like the 2020 Report, must leave the optimum technique of development to others to determine. Nevertheless, the view of the AHC is that the U.S. should take a constructive, comprehensive and vigorous lead in fostering a cooperative approach.

NASA is to be commended for its long-standing efforts in this regard. U.S.-Canadian relations in space activities since shortly after the establishment of NASA--from the Topside Sounder Project, through the Shuttle's "Canadarm" and the MSAT project (discussed later), to the space station--are rightfully seen by both sides as excellent examples of international cooperation.

Another dimension to this topic is, of course, that of U.S./Soviet cooperative efforts in space. The prospects of such cooperation have languished since the Afghanistan crisis but, fortunately, now show signs of reviving to their full potential. Both nations have been cooperating in the relatively low-cost Space and Rescue Satellite (SARSAT) program, although budgetary priorities have at times been allowed to limit U.S. participation. A U.S. scientific payload has flown recently on a Soviet space flight. The ramifications of such efforts for world peace are so great, in the view of the AIAA AHC, that they should be regarded as a high, if not the highest, priority mission area of the Civil Space Program. Any technology developments that those efforts may require should be given correspondingly high priority.

I. GLOBAL HABITABILITY

Since 1980, NASA has shown a commendable, though understandably limited, interest in global habitability. If space is truly for the benefit of all mankind, then civil space programs relevant to enhancing global habitability should logically take precedence over all others. The earth-oriented missions of NASA and NOAA (National Oceanographic and Atmospheric Administration) certainly fall in this category and, along with U.S./Soviet cooperative efforts in space and their potential for world peace, could easily be rated highest on a scale of tangible benefits to mankind. Close behind, if not of equal rank, could be the Space Station.

By contrast, full-scale manned exploration and exploitation of the Moon and Mars must be placed, at least for the present, farther down the scale. For unless those distant missions are clearly and contiually demonstrated to be worth their inevitably large costs in terms of improving the day-to-day condition of most of humanity, then the right to impose such costs on society for the benefit of what could be seen as only a very small, elite sector of mankind will be highly (and justifiably) questionable. Making them international missions would certainly help. But added to that, clearly, would be the continuing need to show that program results are contributing to the improvement of global habitability. More specifically, it may make sense to establish an active and high-profile effort to publicize the spin-off benefits to mankind of such major programs.

IV. FUTURE SPACE SYSTEM OPPORTUNITIES

A. INTRODUCTION

Consideration of future space system opportunities gives insight to directions worth taking in technology development. In that regard the following discussion will supplement the 2020 Report (2) as appropriate in light of new developments and changes in perspective since 1980. The reader should keep in mind that the analysis of future system concepts is an iterative process, one that is aimed at reaching a timely balance between ideals and practicality. Therefore, perceptions as to what constitutes critical technology change because of changes in requirements as well as advances in development.

B. APPLICATIONS

1. EARTH ORIENTED

a. Civilian Communications.

The demand for domestic satellite communications in the U.S. will continue to increase. According to NASA forecasts (13, 18), demand will grow at a rate of 10 percent through 1990 and drop to a growth rate of 6 percent through 2000, as illustrated in Figure 1. This implies 19,000 36-MHz equivalent transponders by 2030, compared with the 480 in orbit at the end of 1984, and well beyond what appears to be the limit of orbital saturation--an aspect we shall return to in a moment. Worldwide deployments since 1980 and current plans through 1990 are highlighted in Figure 2.

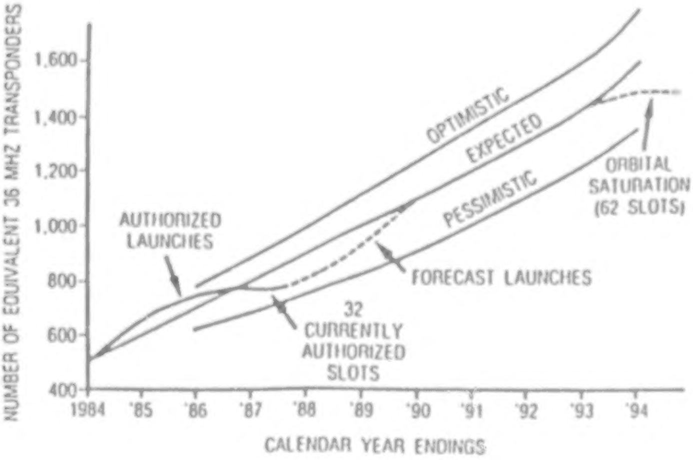


Figure 1. Projected Number of Transponders

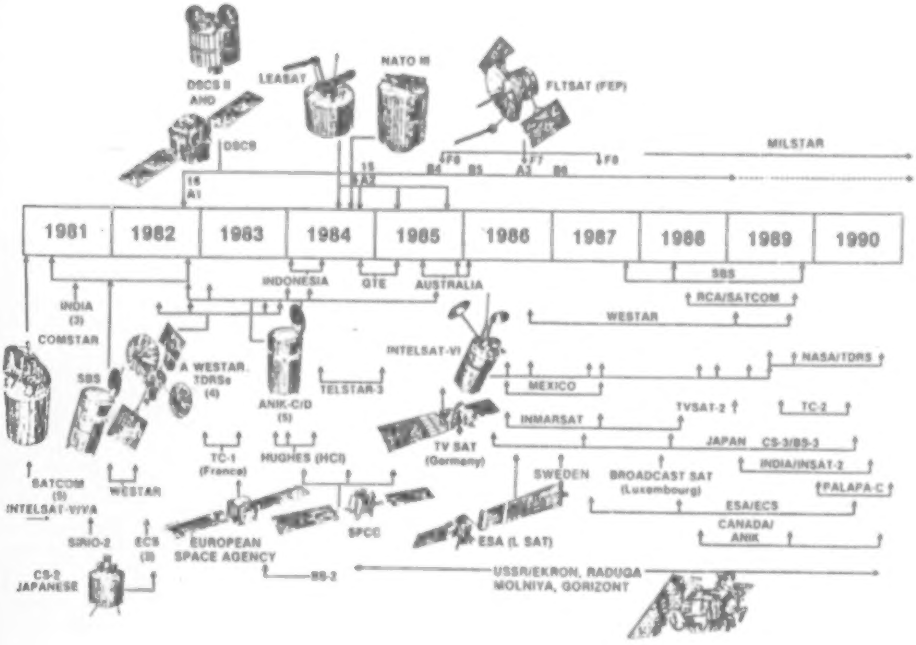

DSCS II AND
LEASAT
NATO III
FLTSAT (FEP)
DSCS
16 A1
15 A2
B4
F6
B5
A3
F7
B6
F8
MILSTAR
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
INDONESIA
GTE
AUSTRALIA
SBS
RCA/SATCOM
WESTAR
INDIA (3)
COMSTAR
SBS
A WESTAR, TDRSs (4)
ANIK-C/D (5)
TELSTAR-3
INTELSAT-VI
NASA/TDRS
MEXICO
TVSAT-2
TC-2
INMARSAT
TV SAT (Germany)
JAPAN
CS-3/BS-3
TC-1 (France)
HUGHES (HCI)
INDIA/INSAT-2
SATCOM (5)
INTELSAT-V/VA
WESTAR
SWEDEN
BROADCAST SAT (Luxembourg)
PALAPA-C
ESA/ECS
SIRIO-2
ECS (3)
EUROPEAN SPACE AGENCY
SPCC
ESA (L SAT)
CANADA/ ANIK
CS-2 JAPANESE
BS-2
USSR/EKRON, RADUGA MOLNIYA, GORIZONT

Figure 2. Communication Satellites: 1980-1990

The International Maritime Satellite (INMARSAT) organization, for example, took over and began expanding the maritime communications system in early 1982 (14). User vessels should grow beyond 10,000 by the early 1990s. Operating in L- and C-bands of frequency (1.4-1.6 GHz and 4-6 GHz, respectively), the three MARISATs in orbit in 1982 have been augmented by leased capacity on two European Space Agency Marecs satellites and three INTELSAT-V satellites. Proposed second generation INMARSATs, beginning in 1988, would more than double current individual channel capacity. A third-generation system is contemplated for the mid-1990s, critical technologies for which include spot-beam techniques that permit reuse of the L-band spectrum, an increasingly precious resource. Use of intersatellite links is being considered. Additionally, so are tie-ins with the COSPAS-SARSAT rescue system and the GPS Navstar system (15), to provide polar coverage lacking in geostationary satellites. Full global coverage is also essential for incorporation of the International Maritime Organization's (IMO) Future Global Maritime Distress and Safety System, scheduled to go into service around 1990.

International service to commercial ships has long existed and the construction of a land mobile satellite system (LMSS) may soon begin (5, 16). The giant step toward a cost-effective international system could come by means of LMSS, a U.S.-Canadian project. A preliminary concept is illustrated in Figure 3. The LMSS would use a large (55-m) 90-beam antenna at UHF and S-band with extensive frequency reuse. These advanced technologies would foster much larger capacity, cheaper terminals, and lowered rates for users. Canada's MSAT program is an early, central part of a future mobile communication satellite service, such as LMSS.

Another part of that service is foreshadowed by NASA's Advanced Communications Technology Satellite (ACTS) program (5, 16). The ACTS program is aimed at lowering the technological (and hence financial) risk for commercialization. It will thus tend to increase competition to operate a mobile satellite service. Large multibeam antennas being essential, NASA has proposed a 4-beam, 10-m-diameter antenna for a 1989 launch, 24 beams and 20 m for 1996, and 90 beams and 55 m for the year 2003. In preparation for the latter two, NASA proposes a Shuttle demonstration of the 20-m antenna and a space station demonstration of the 55-m antenna.

At that rate it may become reasonable to begin the LMSS with a "second-generation system" to accelerate the advent of lower user costs (16). LMSS communications services are expected to provide domestic mobile radio telephone (voice) service to 135,000 users, and digital data services (paging, dispatch) to another 1,000,000 users by the year 2000. This demand could be met by a 4300 channel mobilsat operating at UHF and/or L-band. At a projected growth rate of 4 percent in the 21st century, a capacity of 17,000 channels will be required by 2035 for the LMSS. Low-price terminals and low per minute rates could make such service affordable to 100,000s of users in remote areas of the U.S. and Canada presently without telephone service. The cheapest mobile satellite transceiver could drop to about $2500 by the late 1990s. That still puts the mass market represented by two-way wrist-watch radios a long way off. But the U.S.-Canadian LMSS would be a major step in that direction.

The LMSS, particularly as it could be applied in principle to other, less-well-developed areas of the globe, is an excellent example of a space system opportunity for the benefit of all mankind.

Mention of wrist-watch radios points to perhaps the ultimate in personal communications. Cited in the 2020 Report, the concept was set forth originally in the seminal, award-winning and still durable survey (17a) conducted for NASA in 1977 by Bekey, Mayer and Wolfe. Two applications are illustrated in Figure 4, both featuring geosynchronous platforms. A citizen's version for regular communications calls for a 25-beam, 65-m antenna with 21 kW of raw power to service 2.5 million users. A rapid voting/polling application with unique pseudorandom identification codes to accommodate 100 million people in an hour would need 116 beams, 50 m and 90 kW.

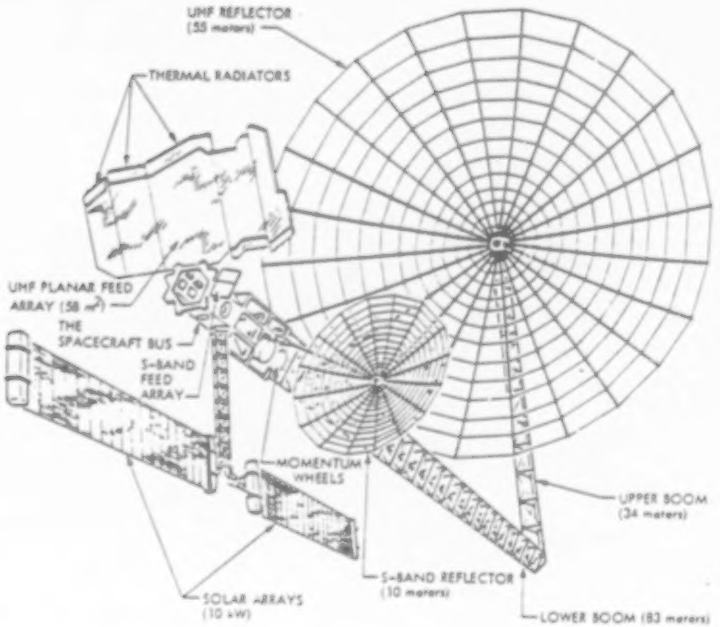
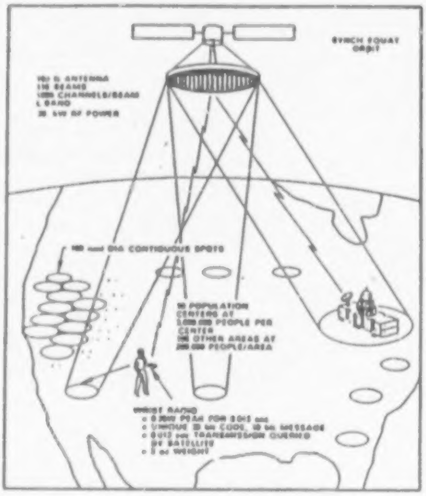

UHF REFLECTOR
(55 meters)
THERMAL RADIATORS
UHF PLANAR FEED
ARRAY (58 m²)
THE
SPACECRAFT BUS
S-BAND
FEED
ARRAY
MOMENTUM
WHEELS
UPPER BOOM
(34 meters)
S-BAND REFLECTOR
(10 meters)
SOLAR ARRAYS
(10 kW)
LOWER BOOM (83 meters)

Figure 3. Land Mobile Satellite System (LMSS) Spacecraft Concept

VOTING/POLLING WRIST SET (CC-7)


SYNCH EQUAT ORBIT
ANTENNA
BEAMS
CHANNELS/BEAM
L BAND
kW OF POWER
DIA CONTIGUOUS SPOTS
POPULATION CENTERS AT
PEOPLE PER CENTER
OTHER AREAS AT
PEOPLE/AREA
WRIST RADIO
TRANSMISSION QUERIED BY SATELLITE
WEIGHT

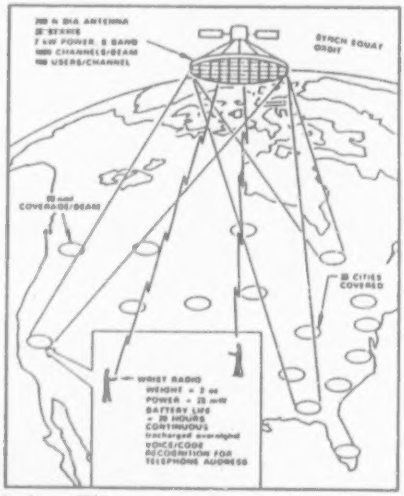
- **PURPOSE**
  To provide direct access to entire population for voting or polling purposes.
- **RATIONALE**
  Voting and polling are time-consuming processes, subject to many errors due to small sample size.
- **CONCEPT DESCRIPTION**
  Multi-channel satellite queries wrist radios, and relays responses to Washington from individual voters. Unique voter pseudo-random codes.
- **CHARACTERISTICS**

• WEIGHT	13,000 lb
• SIZE	150-ft dia antenna
• RAW POWER	90 kW
• ORBIT	Synch. Equat.
• CONSTELLATION SIZE	1
• RISK CATEGORY	1 (Low)
• TIME FRAME	1990
• IOC COST (Space only)	300 M

- **PERFORMANCE**
  100,000,000 people polled/vote in one hour. Any 10-bit message relayed automatically upon query by satellite.
- **BUILDING BLOCK REQUIREMENTS**

• TRANSPORTATION	Shuttle and tandem tug
• ON-ORBIT OPERATIONS	Automated or manual servicing unit; assembly on orbit
• SUBSYSTEMS	Attitude control; antenna; processor
• TECHNOLOGY	Large multibeam antenna; multi-channel transponder; LSI processor; multiple-access techniques
• OTHER	LSI wrist transceiver

PERSONAL COMMUNICATIONS WRIST RADIO (CC-9)


DIA ANTENNA
kW POWER, S BAND
CHANNELS/BEAM
USERS/CHANNEL
SYNCH EQUAT ORBIT
COVERAGE/BEAM
CITIES COVERED
WRIST RADIO
WEIGHT = 2 oz
POWER =
BATTERY LIFE
HOURS
CONTINUOUS
(recharged overnight)
VOICE/CODE
RECOGNITION FOR
TELEPHONE ADDRESS

- **PURPOSE**
  To allow citizens to communicate through exchanges by voice, from anywhere.
- **RATIONALE**
  Mobile telephones are desirable, but should be wrist worn. Uses include emergency, recreation, business, rescue, etc.
- **CONCEPT DESCRIPTION**
  Multichannel switching satellite and wrist transmitter-receivers connect people anywhere to each other directly or to telephone networks. Analog or vocoded voice used.
- **CHARACTERISTICS**

• WEIGHT	16,000 lb
• SIZE	200 ft dia antenna
• RAW POWER	21 kW
• ORBIT	Synch. Equat.
• CONSTELLATION SIZE	1
• RISK CATEGORY	1 (Low)
• TIME FRAME	1990
• IOC COST (SPACE ONLY)	300M

- **PERFORMANCE**
  25,000 simultaneous voice channels, each shared by up to 100 users: 2.5 million people communicate by normal voice.
- **BUILDING BLOCK REQUIREMENTS**

• TRANSPORTATION	Shuttle and large/tandem tug or SEPS
• ON-ORBIT OPERATIONS	Automated or manual servicing unit; assembly on orbit
• SUBSYSTEMS	Attitude control; antenna; processor; repeater
• TECHNOLOGY	Large multibeam antenna; multi-channel repeater; LSI processor, multiple-access techniques
• OTHER	Wrist transceiver, LSI technology

Figure 4. Future Personal Communications (Wrist Radio) Concepts

As a natural extension of the foregoing advances, it is reasonable--and desirable--to envision the development of a national data and voice link satellite system to provide emergency medical services in remote areas. Such a system could include the capability to advise of medical emergencies, to facilitate transmission by paramedics of data to medical centers, with feedback of instructions drawn from nationwide sources, if appropriate, to attending medical personnel. Estimates of the potential number of lives saved each year in the U.S. alone might be conservatively put at 100,000 or more, with global benefits correspondingly larger.

Not surprisingly, it is easy to forecast a major strain on satellite capacity by the turn of the century, as was illustrated in Figure 1. From the standpoint of frequency crowding, high frequencies for wider bandwidths as well as advanced onboard processing techniques appear necessary. From the standpoint of physical crowding, closer spacing will demand improved side-lobe control and stationkeeping capabilities to minimize mutual interference.

In order to increase the utilization of geosynchronous orbital locations, one can conceive of clustering two or more unmanned platforms. Such clusters could feature cross-banded payloads such that, say, a "non-congested" country could interface at C-band with a "highly-congested" country operating at Ka-band. Besides that at Ka-band, technologies that would have to be developed include high-speed onboard switching systems to effectively manage available resources, and automated systems for control of power and perhaps also traffic. Initially the cluster system concept might employ a pair of somewhat traditional satellites cross-banded with each other. By 2010, however, one might see clusters in operation that have common subsystems and are designed for on-orbit servicing by, as well as rendezvous with, a suitably equipped orbiting maneuvering vehicle (OMV). The OMV would be able to replace either a module on a given platform in the cluster or the entire platform. In the latter case, it would retrieve the platform and return it to an orbital repair station for refurbishment and later reuse. In addition to rendezvous, the sensors, navigation and guidance capabilities of the OMV would permit it to inspect the platforms (or other orbiting objects as appropriate) for overall damage assessment and report-back to the repair station, as necessary.

A basic challenge would lie in the guidance and control of such clusters. Initially, stationkeeping of small clusters would be done from the ground. By 2010, however, each platform in a cluster, as well as the various clusters themselves, could be autonomously controlled with respect to a common reference system, using the Global Positioning System (GPS) or a Lidar system, say. The periodic need for refueling may represent another related challenge, depending on the onboard propulsion subsystem selected.

It may also make technological, as well as economic and political, sense to begin thinking of large international geosynchronous platforms capable of collectively housing the communications satellites of various countries now being handled individually. Such geosynchronous condominia could be a worthwhile option for NASA to pursue in its planning for a geosynchronous space station as illustrated in Figure 5 from Reference 5. Relevant lessons learned from experiments on the low earth orbit (LEO) station would certainly be valuable.

Besides those pointed out above, orbital technologies for large antennas in orbit, especially those exceeding the size of the Shuttle bay, will include their assembly, test and evaluation and autonomous maintenance in orbit as well as the operational control of their attitude and figure.

b. Civilian Navigation and Location

Civilian applications of DOD's Global Positioning System (GPS) Navstar system are under study (15) and should be available to a growing class of users, especially as the cost of receivers goes down. Indeed, several commercial applications have already been applied for, to the FCC. Satellite auto-navigation, for orbits higher than that of Navstar, is possible

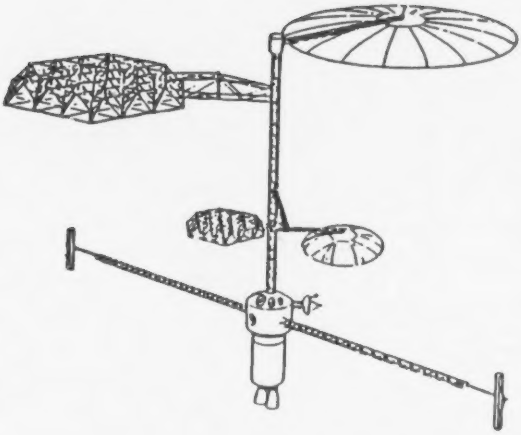


Figure 5. Geosynchronous Space Station

using GPS satellites equipped with an aft antenna. If the terrestrial user is also equiped with an emergency transponder to relay his or her position--say, a transponder compatible with the COSPAS/SARSAT system--then, because of the high accuracies offered by GPS, valuable search time could be saved.

Apart from emergencies, GPS receivers coupled with transponders would offer economic advantages to shippers in tracking the progress of freight transfers by truck, train, airplane or ocean vessel.

Coupled with the advances in mobile communications systems just discussed, the combination of a GPS receiver and transponder would open new opportunities for aircraft safety as well as for the use of inexpensive pilotless missions. Specifically, suitably equipped aircraft could be remotely controlled from any point on the globe or in orbit. Thus, for example, fatal implications of commercial airliners straying off course would be averted; the consequences of pilot incapacitation or of seizure of aircraft by hijackers could be reduced or even entirely prevented. Rapid, close-in search and rescue missions, including time-urgent air drops, could be facilitated using pilotless aircraft. Such a capability may also be valuable in crisis situations where the ultimate fate of the flight crew may be a decisive factor.

Beyond the development of small, inexpensive GPS user terminals, the critical technologies for these opportunities are essentially those already discussed for communications. Indeed, since the GPS concept is basically that of a form of communication, one can conceive of packaging GPS payloads aboard platforms (17b) such as those described in the cluster concept mentioned in the previous section.

c. Earth Observation and Sciences

The 2020 Report forecasted a wide range of capability improvements which, through the work of NASA and NOAA, now appear well on course toward realization. Additionally, the system concepts involved as described by NASA (5) and NOAA (19) appear for the most part to be free of high risk technology advancements. By way of illustration of near-term developments, we mention only a few of the many system concepts that NASA and NOAA have been examining.

The GOES-G and -H satellites (5) in geosynchronous orbit will provide visible and infrared (IR) imaging, as well as radiometric data on the earth's atmosphere and data from space environment monitoring instrumentation. NOAA is upgrading the related data processing and ground systems as well as planning on more capable follow-ons, through GOES-N by the year 2000, to include solar x-ray imagers and atmospheric sounders (19, 20).

The NOAA F-J satellites in low earth orbit (LEO) will feature a variety of sensors principally directed to improved weather predictions. Instrumentation also includes balloon and buoy tracking capability for oceanography, earth radiation budget measurements, and a search and rescue receiver tied into the COSPAR/SARSAT system. NOAA projects through NOAA-M in the early 1990s to be followed by NOAA's Polar Operational Environmental Satellite (POES) shown in Figures 6 and 7. Like its predecessors, POES would join related efforts of DOD as well as those of the international community. Unlike its predecessors, POES would be a permanent platform periodically serviced by astronauts.

Related to NOAA's POES concept is NASA's Project Z concept, which sheds some light on critical technologies for both. Project Z (5) would be a permanent, highly adaptable civil space facility in LEO for the scientific study of the earth and the development of related technology. Like POES--and ultimately, perhaps, identical to POES--System Z could make use of two polar platforms periodically man-tended. Critical technologies would include automation, fault tolerance, advanced user-interactive data systems, and related software developments--not unlike those already anticipated for the nonpolar space station complex.

As an alternative to a single man-tended platform, one might consider a cluster of separate platforms that are connected by tethers and appear as a single large communications antenna to other communications antennas. Other advantages include better dynamic and electromagnetic interference (EMI) isolation between sensors.

The TOPEX/Poseidon Project (5) deserves mention. It is a joint U.S./French ocean topography experiment proposed by NASA and France's Centre National d'Etudes Spatiales (CNES) to collect state-of-the-art global ocean altimetry data over a three-year period. Launch is scheduled for late 1990 aboard a French Ariane. Besides its payoffs to the scientific, shipping and fishing industries, as well as to international cooperation in space, the project will, if launched on schedule in 1990, tie in most advantageously with the late 1989 launches of the Navy's Remote Oceanographic Sensing Satellite (N-ROSS) system, and ESA's Earth Resources Satellite (ERS-1). That timing also phases TOPEX/Poseidon in with the Tropical Ocean and Global Atmospheric (TOGA) program and the World Ocean Circulation Experiment (WOCE).

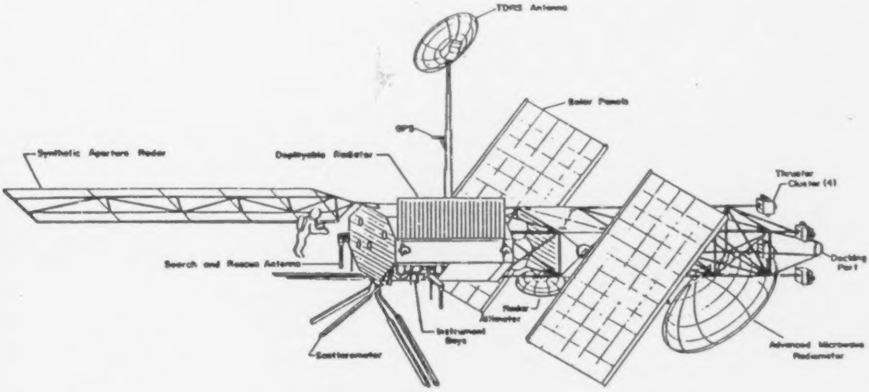


Figure 6. Space Station Polar Platform (NOAA Concept)

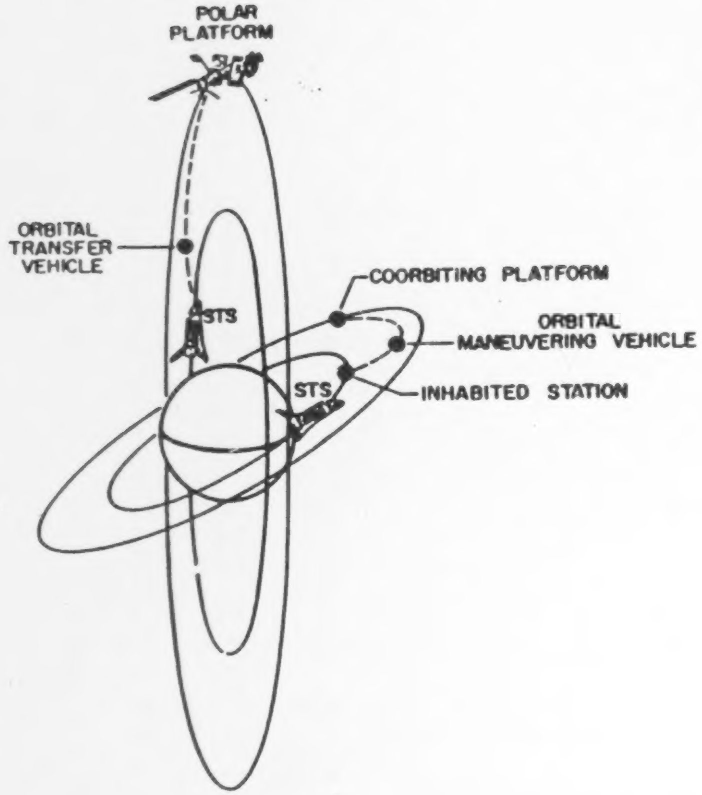


Figure 7. Space Station Complex (NOAA Concept)

Despite the manifest worth of TOPEX, NASA was recently compelled by budgetary constraints to protect ongoing programs, such as Shuttle operations and to remove all FY 1986 new starts from its budget proposal--including TOPEX. As such, TOPEX is noteworthy in that it exemplifies the budgetary inhibitions often levied, however inadvertently, on maintaining a strong technological base. Clearly, the lesson to be learned is that the creation and maintenance of a strong technology base it is not always a matter simply of identifying the critical technology involved; essential funding is also critical along with a genuine commitment to national excellence.

Looking ahead to the year 2030, satellites will have become the principle element of the observational system for environmental assessments and forecasts. The mid-21st century descendant of today's National Weather Service will make numerical weather predictions based on analyses of hourly upper air satellite observations, in contrast with the old "synoptic times" geared to the convenience of balloon observations. Mass data storage is the critical technology here. Optical disks may contribute, but what is needed is a true read/write medium with multiple cycle capability and a submicrosecond access time.

Absolutely essential is the task of improving the resolution of infrared (IR), microwave (MW) and ultraviolet (UV) soundings of the atmosphere. By 2030 the use of MW soundings (10-200 GHz) will yield observations uninhibited by clouds or even light rain. IR and MW readings can be combined to form a single, more accurate than otherwise, sounding over areas obscured by clouds. IR soundings from geostationary platforms will improve capabilities to predict and monitor tornadoes, hurricanes, and convective cells resulting in flash floods.

With respect to imagery, no great advances seem needed for environmental remote sensing because the requirements for 2030 can probably be satisfied by current capabilities, e.g., Landsat and SPOT (Systeme Probatoire pour l'Observation de la Terre). Nevertheless, advances in knowledge of terrestrial atmospheric chemistry are needed to aid in correcting for the image degradation caused by industrial haze and volcanic dust.

Microwave sensing improvements will greatly aid by 2030 in measuring soil moisture. Such measurements are of importance not only to the forecasting of crop conditions (and the threat of famine) throughout the world; changes in soil moisture arising from terrain features and soil texture have been found to cause variations in convection arising from daily solar heating. Convection changes in turn are found to be enough to trigger thunderstorms.

Tied to the foregoing and on a much larger scale, it is possible by 2030 to have in hand the twenty-year data base needed to support reliable forecasts of changes in climate. With the exception of NASA's Earth Radiation Budget Experiment (ERBE) satellite, the key elements are not now being measured in sufficient detail. Besides terrestrial heat balance, these include, at a minimum, global cloud cover, sea surface temperature, and global ozone monitoring.

Remote sensing instruments and programs for air, space, and land surface measurements have developed much more rapidly than instruments and programs for water observations. Sensors to measure bathymetric parameters used in conjunction with ground truth measurement programs have been seen as having the earth-oriented potential of saving costs related to millions of tons of shipping per year because of more exact and current navigation charts. Water quality, ecological dynamics, and ocean flow could be measured globally for the first time and with greater frequency at, in view of the benefits derived, a reasonable cost.

By 2030 observations from satellites carrying radars and/or scatterometers, e.g., TOPEX or better, should permit calculation of wave amplitude and spectra, as well as surface-wind velocities and directions--which drive wave characteristics. Surface wind forecasts by 2030 should be as commonplace as weather forecasts are today. Correspondingly, measurements of ocean topography using radar altimeters will permit direct estimation of currents. Similarly with ocean color instrumentation which by 2030 will help to pinpoint areas most promising for investigation by fishing vessels.

As our climatological knowledge deepens over the next 50 years, it should become possible, and possibly even routine, to intervene so as to prevent weather-related destruction. Rather than merely warn of approaching disasters, it may be possible to selectively heat a limited volume of the atmosphere and thereby either dissipate the intensity of a potentially destructive storm or deflect it to less vulnerable regions. The progress of research into weather modification is likely to be slow, because of the need for caution comparable to that exercised in medical experiments on humans. The use of large space structures to transmit relatively large amounts of energy toward the Earth's surface has been and is being explored for other purposes; weather modification may not be too distant a spin-off (if not an inevitable environmental impact) of such an effort.

d. Manufacturing in Space

The systems opportunities relative to manufacturing in space, i.e., in a microgravity environment, are still largely nebulous, consistent with the views given in the 2020 Report. Some experimental progress has been made on the Shuttle in the last five years but, as noted previously, beyond possibly favorable prospects for high-value pharmaceutical production, the technological practicality--much more, the commercial attractiveness--of manufacturing in space is still to be established.

This is not to say, however, that the benefits to all mankind from orbital production of highly potent medications alone will not be worth the effort. If preliminary estimates of their potential curative effectiveness are at all accurate, the number of lives saved (not to mention the associated medical cost avoidance) might by themselves justify the entire space effort up to now.

Be that as it may, the years beyond 2000, if not before, could see a significant growth in the space manufacture of products requiring either a vacuum or low-g environment for production. Besides pharmaceuticals, these products could include crystalline materials and wafers as well as parts and subassemblies that would be used for spacecraft being assembled in orbit. Free-flying platforms of the 1990s and the Space Station would presumably have provided ample opportunities for experimentation, development and practical experience in production.

Automation and robotics technology would see increased demands, especially where manufacturing environments in space that are hazardous to humans, are involved. The unmanned manufacturing platforms implied would be designed, like those mentioned previously regarding communications, so that they could be remotely serviced or brought to a repair station in orbit. In addition, to minimize interactions with humans in such cases, the loading of raw materials and the removal of finished projects would be performed autonomously to the maximum extent possible.

e. Power and Energy

The projection of power and energy in orbit for use of earth still remains a long-term opportunity. The Solar Power Satellite (SPS) studies, such as that which occasioned the 2020 Report, may soon merit revisiting in light of advancing technology and increasing population pressures (and environmental constraints) on terrestrial energy resources. The LEO and GEO space station efforts have provided more accurate insights than were available in 1980 on much of the infrastructure and critical technology advances required.

The BMW report (17), from which Figures 8 and 9 are drawn, gives a feel for the magnitude of the endeavor. A solar/microwave satellite as part of an orbiting "solar energy farm" in geosynchronous orbit would involve a truly large space structure (7.2 x 2.6 nmi) generating 10,000 MW of raw power with 5000 MW delivered via X-band to a 10 KM rectenna on earth. A nuclear/microwave satellite with the same production and delivery would call for an on-orbit structure roughly one-tenth the size. Alternatively, if the 10,000 MW is generated on earth, one might conceive of a system of geosynchronous reflectors, each 1 KM in diameter. In either case, a space-station-like infrastructure such as that depicted in Figure 10, is applicable.

As noted previously, once a reliable grasp of climatology is in hand, including knowledge of how weather is and can be influenced, it is conceivable that the ability to produce and deliver via satellite large amounts of power to the earth may yield a capability to control violent storms, thereby mitigating if not entirely preventing their disastrous effects. On the negative side, investigations of ionospheric disturbances by large earth-based radars already in existance suggest that the environmental impact of transmitting large amounts of power from orbit to earth will have to be thoroughly understood.

ENERGY GENERATION - SOLAR/MICROWAVE (CS-1)

- **PURPOSE**

  To provide abundant electrical power with little pollution.

- **RATIONALE**

  More and clean energy needed.

- **CONCEPT DESCRIPTION**

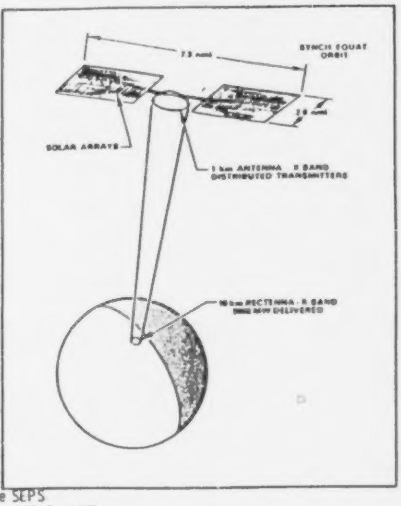
  Solar energy is collected, converted to microwave energy, and transmitted to earth, where it is rectified to DC by a rectenna.

- **CHARACTERISTICS**

• WEIGHT	40,000,000 lb
• SIZE	7.3 x 2.6 nmi
• RAW POWER	10,000 MW
• ORBIT	Synch. Equat.
• CONSTELLATION SIZE	1
• RISK CATEGORY	IV (High)
• TIME FRAME	2000
• IOC COST (Space only)	61 B

- **PERFORMANCE**

  5,000 megawatts supplied to 10 km collector, with less than 500 MW lost as heat to the environment, at a cost of ≈ $1,500 per kW.


7.3 nmi
SYNCH EQUAT ORBIT
2.6 nmi
SOLAR ARRAYS
1 km ANTENNA X BAND DISTRIBUTED TRANSMITTERS
10 km RECTENNA - X BAND 5000 MW DELIVERED

- **BUILDING BLOCK REQUIREMENTS**

• TRANSPORTATION	LLV and large tug and large SEPS
• ON-ORBIT OPERATIONS	Manned servicing unit; assemble in orbit
• SUBSYSTEMS	Attitude control; structures, power antenna
• TECHNOLOGY	Large economical solar arrays; large active microwave antenna; high power tubes; feeding and cross-connects
• OTHER	Rectenna on ground

ENERGY GENERATION - NUCLEAR/MICROWAVE (CS-3)

- **PURPOSE**

  To generate and deliver electrical energy without pollution or hazard.

- **RATIONALE**

  Power is needed which requires no radioactive material on earth, produces no atmospheric heating, and no resource consumption.

- **CONCEPT DESCRIPTION**

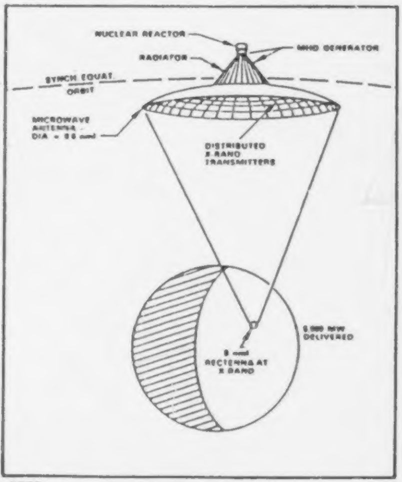
  A breeder reactor, MHD power generator, microwave transmitter, and microwave antenna are used to beam energy to a ground receiver. Fuel breeding supplies fuel.

- **CHARACTERISTICS**

• WEIGHT	TBD
• SIZE	3,600-ft dia
• RAW POWER	10,000 MW
• ORBIT	Synch. Equat.
• CONSTELLATION SIZE	1
• RISK CATEGORY	IV (High)
• TIME FRAME	2000
• IOC COST (Space only)	TBD

- **PERFORMANCE**

  5,000 Megawatts delivered power continuously - with sufficient fuel breeding for a life of at least 1000 years.


NUCLEAR REACTOR
MHD GENERATOR
RADIATOR
SYNCH EQUAT ORBIT
MICROWAVE ANTENNA - DIA = 0.6 nmi
DISTRIBUTED X BAND TRANSMITTERS
5,000 MW DELIVERED
8 nmi RECTENNA AT X BAND

- **BUILDING BLOCK REQUIREMENTS**

• TRANSPORTATION	LLV and large tug and large SEPS
• ON-ORBIT OPERATIONS	Manned service unit, automated servicing unit; assemble in orbit
• SUBSYSTEMS	Structure; attitude control; antenna; reactor; power unit
• TECHNOLOGY	Large active microwave antenna; large reactor; heat radiator; MHD power generator; pointing and tracking sensor
• OTHER	Rectenna on ground, safety

Figure 8. Energy Generation from Space

POWER RELAY SATELLITE (CS-15)

- **PURPOSE**

  To provide for transmission of electrical power from remote regions, minimizing environmental impact.

- **RATIONALE**

  Power should be generated in remote regions.
  Sunny side of Earth can supply power to night side.

- **CONCEPT DESCRIPTION**

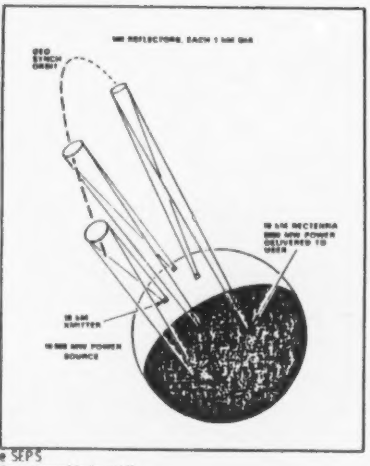
  Source power is converted to a microwave beam, bounced off an orbiting reflector, and reconverted to DC at receiving antenna on ground.

- **CHARACTERISTICS**

• WEIGHT	600,000 lb
• SIZE	0.5-nmi dia
• RAW POWER	---
• ORBIT	Synch. Equat.
• CONSTELLATION SIZE	100
• RISK CATEGORY	IV (High)
• TIME FRAME	1995
• IOC COST (Space only)	36 B

- **PERFORMANCE**

  5,000 megawatts delivered to each of 100 user areas. 53 percent overall DC-DC efficiency attained. Total energy is about 10 percent of U. S. consumption.


100 REFLECTORS, EACH 1 KM DIA
GEO SYNCH ORBIT
10 KM RECTENNA 5000 MW POWER DELIVERED TO USER
10 KM EMITTER
10,000 MW POWER SOURCE

- **BUILDING BLOCK REQUIREMENTS**

• TRANSPORTATION	LLV and large tug or large SEPS
• ON-ORBIT OPERATIONS	Manned/automated servicing, assemble in orbit
• SUBSYSTEMS	Attitude control; structures, phase front control
• TECHNOLOGY	High efficiency, large, passive steerable phase front antenna; ion thrusters
• OTHER	Ground-based elements

Figure 9. Power Relay Satellite Concept

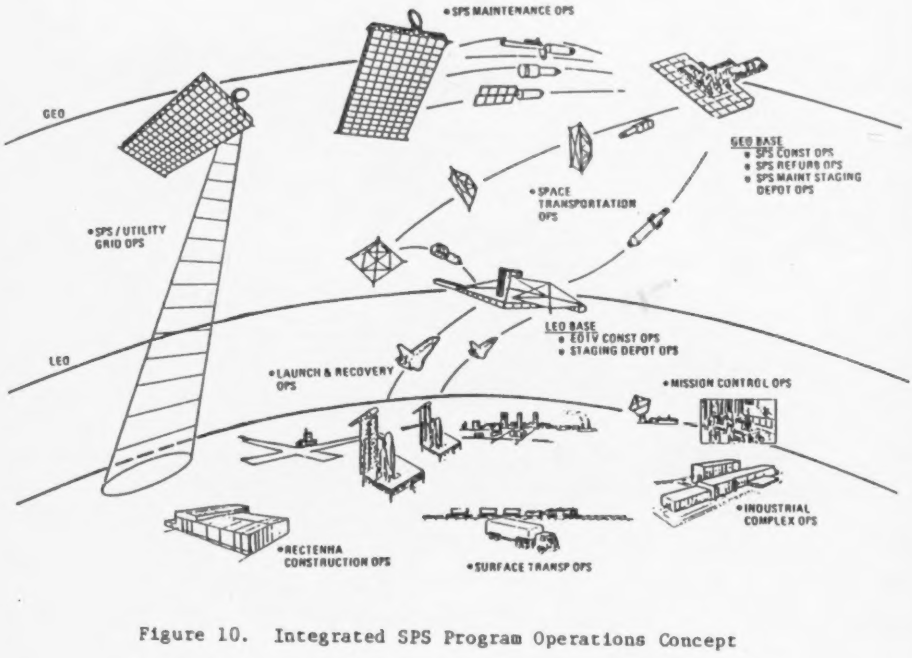

• SPS MAINTENANCE OPS
GEO
GEO BASE
• SPS CONST OPS
• SPS REFURB OPS
• SPS MAINT STAGING DEPOT OPS
• SPACE TRANSPORTATION OPS
• SPS / UTILITY GRID OPS
LEO BASE
• EOTV CONST OPS
• STAGING DEPOT OPS
LEO
• LAUNCH & RECOVERY OPS
• MISSION CONTROL OPS
• INDUSTRIAL COMPLEX OPS
• RECTENNA CONSTRUCTION OPS
• SURFACE TRANSP OPS

Figure 10. Integrated SPS Program Operations Concept

Interest in the basic idea of a Solar Power Satellite (SPS) is still alive as a candidate concept for 2030. Glaser (21), for example, argues for it not as a system for immediate commitment, but rather as a long-term goal to guide development of space technology incrementally. Brown (22) has outlined the technological potential for energy transmission using a thin-film etched phased array antenna, including its use for low-cost microwave-powered orbital transfer to geosynchronous orbit.

The generation and transmission of such large amounts of energy is, of course, of interest to the Strategic Defense Initiative Program (SDIP). It would be interesting, were one of the spin-offs of the SDIP to be a feasible power satellite system.

f. Nuclear and Toxic Waste Disposal

Rising environmental concerns justify more than ever an interest in the use of space as a place to dispose of nuclear and toxic wastes. The idea is extensively discussed in the 2020 Report and still merits consideration. No critical technology advances are entailed, and even at today's space transportation costs it may still be worth doing compared with the terrestrial alternatives.

2. PROTO-COLONIES IN ORBIT

A permanently manned space station can be regarded as a proto-colony in LEO. Although it may be smaller than the one with a capacity of several hundred persons envisioned in the 2020 Report, it fits all the other characteristics mentioned there.

It remains to be seen, however, whether or not a permanently manned space station could evolve into one housing a sizeable population in orbit. The critical technology here, as on earth, is that of people and all that it takes to make them members of a peaceful, healthy, productive, and hopeful society. Such a technology is likely to take generations to achieve and possibly not until the 22nd century. The component technologies involved are discussed later and bear as well on manned basing on the Moon and Mars.

3. MOON EXPLORATION AND EXPLOITATION

The 2020 Report outlined a prospectus in this mission area that still seems valid. In the intervening time, interest has increased in a return to the moon, possible under international auspices, in particular as a means of effecting U.S./Soviet cooperation in space. While such justification may be more than sufficient to get started, nevertheless as the 2020 Report points out, "the scope of lunar exploitation during the early 21st century will depend upon discoveries and progress in utilizing cislunar space and unmanned lunar missions that will occur during the 1990s." In that sense, lunar exploration can be viewed as Glaser (21) can be said to view the realization of Solar Power Satellite, that is, not as an immediate objective, but rather as a long-term goal to guide, step-by-logical-step, the advance of science and technology.

In that respect, it is useful to note that NASA is planning a Lunar Geoscience Orbiter (5). Its objective would be to collect a year's worth of data on the moon's surface composition, resources, topography and gravity field. As Bekey notes (23.c), tether applications from a lunar orbiter could include their use in scooping up soil samples as well as in transportation.

A follow-up mission might employ Mayer's concept of swarms (23.a), which we discuss later in relation to the exploration and exploitation of Mars. Suffice it to say at this point that it envisions a mother satellite, possibly manned, orbiting about the body and selectively implanting a multitude (swarm) of surface and subsurface sensor packages. These in turn would relay back their in situ measurements for analysis either on the mother satellite or on earth.

Manned landings at the most interesting sites might then follow for more detailed prospecting, including setting up automated equipment for drilling, mineralogical analysis, and investigatory processing over extended areas after the crews depart.

Favorable economic indications from such preliminary missions would confirm the worth of proceeding toward the eventual establishment of a permanently manned lunar base.

Recent work on promising approaches to making such a base viable was presented at the 1985 SSI/AIAA/Princeton Conference on Space Manufacturing. This includes considerations of mining; base construction; production of oxygen, iron, concrete, and power; and earth-moon transportation. (The papers of Glaser (21) and Brown (22) from the Conference have already been cited.)

4. MARS EXPLORATION AND EXPLOITATION

a. Perspective

Since the 2020 Report, the idea of a manned expedition and settlement on Mars has resurfaced. In its response to the President's Space Task Group (STG) in July 1969 after the success of Apollo 11, NASA advocated a Mars expedition and proposed a Shuttle, heavy-lift launch vehicle (HLLV) and space station as necessary elements of the required infrastructure. The FY 1971 budget was cut, however, and only the Shuttle idea survived. On January 5, 1984, in time for FY 85 budget, the President directed NASA to begin development of a space station. In August, NSDD No. 144 (8) called for, among other things, a joint DOD-NASA study effort toward new space transportation capabilities, as part of which it is generally agreed that an HLLV development would be of mutual interest, along with a next-generation upgrade of the Shuttle. Even though the motivations for them are coming from different directions, some of the key elements of an infrastructure to support a Mars expedition are beginning to appear.

Then there is the fact of a renewed motivation to consider a manned Mars expedition. One dimension of that fact is embodied in the NCS itself, i.e., the desire of Congress and the Administration to establish sensible long-range goals and objectives for the Civil Space Program. Another and equally praiseworthy dimension is the desire to re-establish U.S./Soviet cooperative activities in space on a long-term basis. In both respects, and considering the imminence of much of the wherewithal to so do, the long-range goal of an expedition to Mars makes sense. Indeed, as with the SDI Program, even if the final goal is never achieved, the spin-off benefits to mankind along the way may by themselves more than justify the effort.

The extent and implications of such a long-range commitment merit special comment. For one thing, from a budgetary standpoint, informal estimates (24) of the earliest time that such a mission could take place, assuming a 3.0 percent annual growth rate in the NASA budget, is about 2030, i.e., 45 years from now, as Figure 11 shows. Setting aside the questions of whether and how economic support can be sustained for so long a time, other factors arise. For it is unlikely that the astronauts/cosmonauts on that first expedition have been born yet. Similarly, we are dealing with at least the next generation of scientists, engineers, technicians, maintenance and support personnel. A critical technology that must be recognized and dealt with from the outset, therefore, is the quality of the education they will receive.

The continuing need to upgrade scientific and engineering education in the U.S. is being increasingly pursued by the AIAA, industry and academe, even without the impetus of a manned Mars expedition. All the more so, therefore, does it merit the active support of the Civil Space Program if such a mission becomes a goal.

b. Orbiters and Samplers

A sensible step-by-step program aimed at an eventual Mars base would begin with unmanned orbiters and samplers to gather essential preliminary information. NASA plans a Mars Geoscience/Climatology orbiter for the early 1990s as well as a Mars Aeronomy Orbiter.

No critical technologies appear to be involved. A one-year transit time, followed by a Mars year (687 days) of observation, plus data analysis points to a three-year mission for each of these opportunities. Given the possible need for backup flights, five years in all might be needed.

Following along lines suggested by Mayer (23a), a Mars probe network is a next logical candidate mission, say in the mid-1990s. As mentioned for Lunar Exploration and Exploitation, the idea is to establish a global network of seismic and meteorological stations, and aerochemical and aerophysical observation sites that could operate on Mars for a long time. Included is the emplacement of penetrators that leave small afterbodies on the surface to transmit data. A manned or unmanned mother ship in orbit collects the data at least once a day, with appropriate initial onboard processing and analysis and then transmission back to earth. The concept of the system when established is illustrated in Figure 12. The concept of establishment, assuming the presence of a space station, is shown in Figure 13. The critical technologies have to do with autonomy and with high-g impact probes and instrumentation.

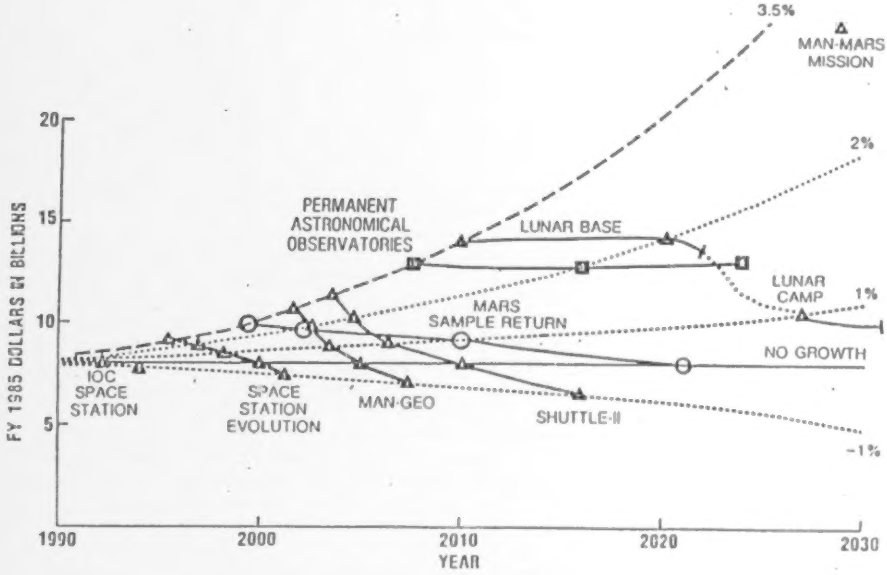


Figure 11. Long-Term Budget Implications

Once the most promising sites have been found, the next step in the mid-to-late 1990s would be to fly unmanned Mars sample return missions such as NASA has in concept formulation. Different flight techniques are under study. In the case of mating the lander/sampler/ascent vehicle with a Mars orbiter, critical technologies involved are autonomous rendezvous, stationkeeping and docking. Another option envisions developing technology for automated (and robotic) in situ propellant manufacture on Mars to enable the sampler to return directly to earth. Given a week's sampling time, each sampler would take about nine months, at least, to complete its mission.

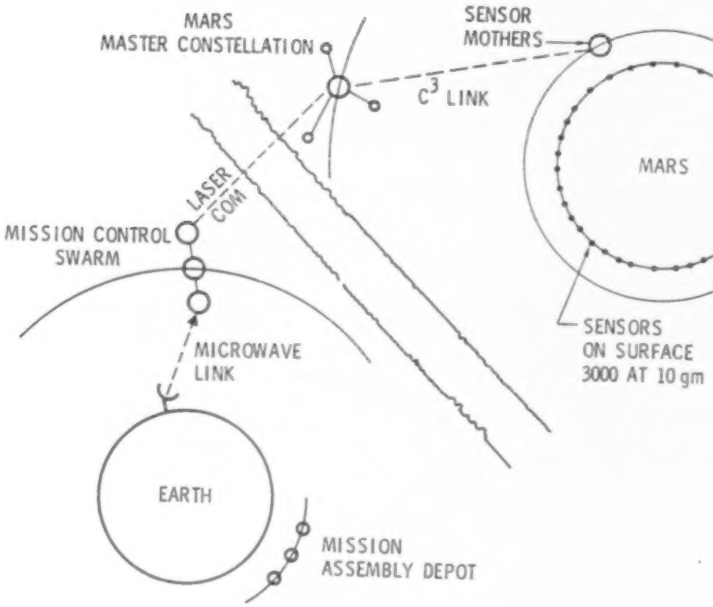


Figure 12. Minor Planet Science Mission

Launching half a dozen samplers might add six months or more to the program with another three to six months for completion of analysis: all in all, about one and one-half to two years, or at the budgetarily unconstrained pace we have been postulating, by the end of the century. (Note from Figure 11 that, if a no-growth NASA budget is projected, a Mars sample return might not take place until 2020.)

The stress just mentioned on automation and robotics is significant because of the long transit time for signals between earth and Mars, i.e., from about 4-1/2 to 23 minutes, depending on the time of year and on whether an orbital communications relay is involved to get the signals around the sun. (Correspondingly longer times must be expected for the asteroidal missions discussed below.) Non-real time mission control is not a new challenge, of course. But when it comes to manned Mars missions, it indicates the need to think in terms of having to transfer real-time mission control functions to the astronauts. This, in turn, implies that the information processing hardware and software equivalents of much that would normally occupy the Mission Control Center at Johnson Space Center will have to be greatly reduced in size, weight and power.

The journey between Earth and Mars and the stay times on Mars are altogether matters of years. If it makes sense at all to send humans to Mars, then the foremost critical technology is that of human support, just as it would be in considering the eventual feasibility of proto-colonies in cislunar orbit or any place else in the solar system.

c. Mars Camp/Base

In establishing a camp or base--the difference is primarily one of purpose, expectations and funding--the first step is to establish a viable habitat. As pointed out in Reference 25, the factors for which technology, training, procedures and infrastructure will be developed are many. For example, radiation protection needs could imply habitat burial which in turn implies a suggested network of tube-like structures (Figure 14)

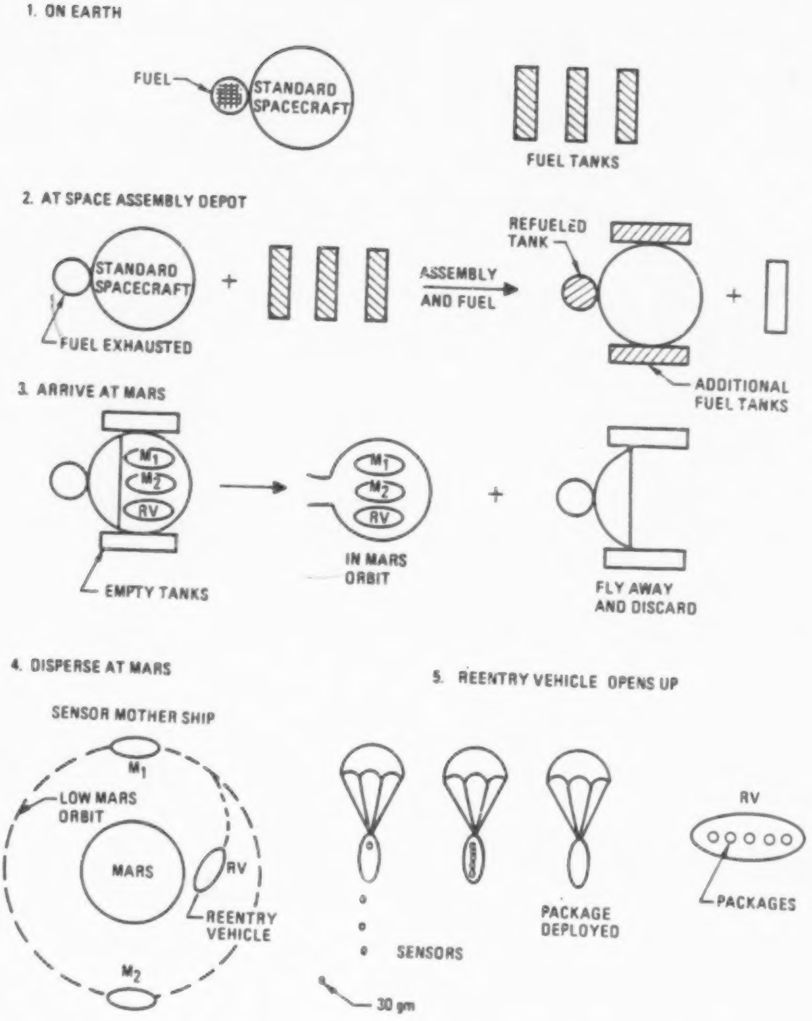

1. ON EARTH
FUEL
STANDARD SPACECRAFT
FUEL TANKS
2. AT SPACE ASSEMBLY DEPOT
STANDARD SPACECRAFT
FUEL EXHAUSTED
+
ASSEMBLY AND FUEL
REFUELED TANK
+
ADDITIONAL FUEL TANKS
3. ARRIVE AT MARS
M_1
M_2
RV
EMPTY TANKS
IN MARS ORBIT
+
FLY AWAY AND DISCARD
4. DISPERSE AT MARS
SENSOR MOTHER SHIP
M_1
LOW MARS ORBIT
MARS
RV
REENTRY VEHICLE
M_2
5. REENTRY VEHICLE OPENS UP
SENSORS
30 gm
PACKAGE DEPLOYED
RV
PACKAGES

Figure 13. Schematic of a Mars Science Mission

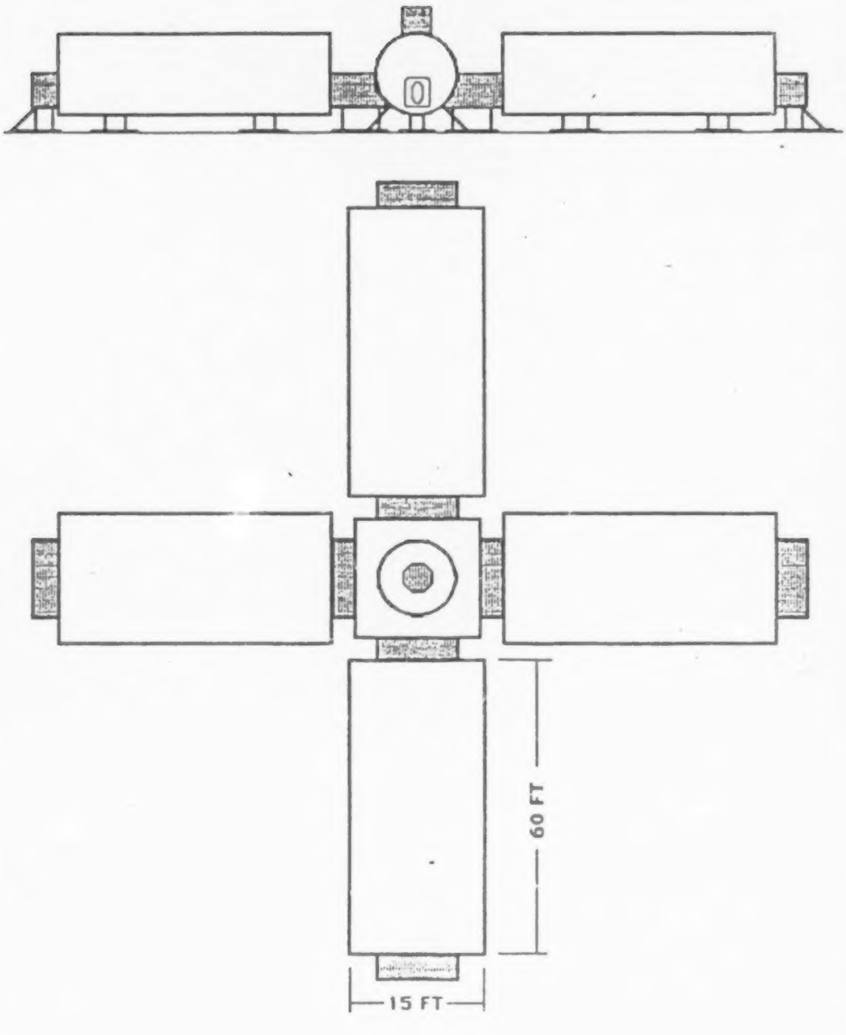


Figure 14. Mars Habitat Concept

that, if not fabricated somehow in situ, will have to be brought. Necessary furnishings and facilities for hygiene, recreation and individual solitude must also be brought and be readily installable, just as with those for research and production. Living space requirements (Figure 15), which tend to increase logarithmically with the number of people, could range up to 400 cu ft per person. A greenhouse would be needed for the raising of crops, i.e., soybeans, wheat, potatoes. So would a disaster management program, an adequate power supply (about 210 kWe) and, of course, the soil moving equipment for burying the habitat after the installation site has been carefully selected.

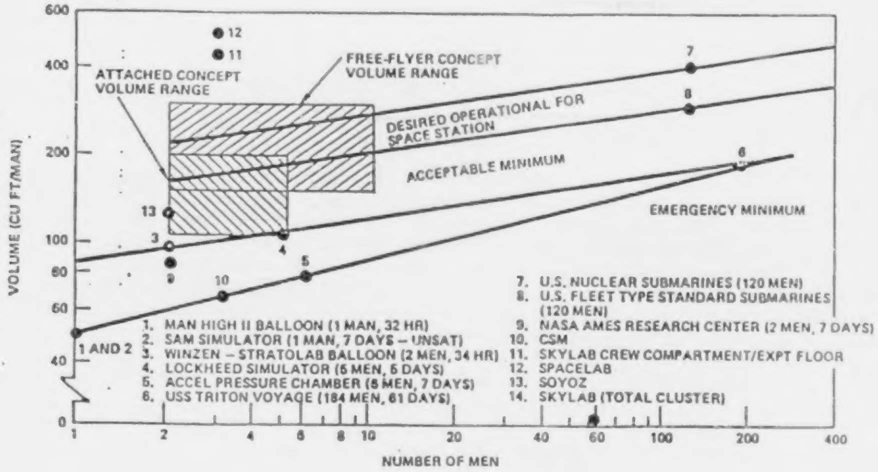


Figure 15. Living Space Requirements
(as seen by McDonnell Douglas Corporation)

Interestingly enough, the study behind Reference 25 was done recently by students at the University of Wisconsin working under the aegis, guidance and review of NASA, in concert with the University Space Research Association. As such it may represent a most productive approach for the Civil Space Program to develop from the standpoint of planning and, just as important, sustaining support for long-term space efforts.

In another, related area, few technologies will be of greater significance to human exploration and utilization of the planets of the solar system than the ability to manufacure propellants on the planets. Even if very high performance deep space drives (e.g., thermonuclear, antimatter) are developed, they probably will not be suitable for landing on and ascending from planetary surfaces. For these purposes chemical propellants will most probably be preferred. At the same time, it will be most desirable to be relieved of the need to transport all propellants from Earth. Thus, regardless of the propulsion scenario that one may invoke, manufacturing propellants using resources on the planets will be highly attractive.

Using Mars as an example, three possible options exist, of which two appear most viable. If we wish to make use of only the atmosphere of Mars, the oxygen/carbon monoxide combination can be generated. Performance of this combination is modest but adequate for most purposes. If Martian water is readily available in large quantities, it can be used in combination with the carbon dioxide atmosphere to synthesize the oxygen/methane propellant combination, which offers excellent performance and relative ease of liquifaction and storage. Both these combinations are attractive, the first because of the easy availability of the raw material and the oter because of its performance and ease of storage. The third choice, assuming availability of water, is the oxygen/hydrogen combination. While tempting because of its high performance, this combination is the least attractive because of the difficulty in liquifying and storing hydrogen as well as its dependence upon the availability of water, which may be relatively unavailable.

While some of the basic technology for in-situ propellant production (ISPP) has been demonstrated at the laboratory level, much more work needs to be done to bring the technology to a point at which it could be confidently applied to planning a mission to Mars. Further, detail system design and analysis needs to be carried out to adequately characterize the systems. Such an activity, begun in the near future, could ensure availability of mature ISPP technology to support manned planetary missions in the late 1990s.

5. INTERPLANETARY EXPLORATION AND EXPLOITATION

a. Comets and Asteroids

As with lunar exploitation, the 2020 Report notes the need for preliminary investigation of asteroids before going further with their exploration. NASA now has two such mission candidates in mind (5): a multiple asteroid orbiter and fly-by, and an earth-approaching asteroid rendezvous. Indeed, the latter would contain instrumentation similar to the Lunar Geoscience Orbiter mentioned previously, such that it may be cost effective to send the Orbiter, as JPL suggests, to a near-earth asteroid after its lunar mission is over. Both missions can be said to add to the technology base.

In the same vein, the Comet Rendezvous mission would provide valuable astrophysical data, particularly with respect to cometary composition in relation to that of the Earth. The critical technology involved is that of developing instrumentation resistive to dust contamination.

Meinel (26) points out that raw material recovery from asteroids can be effected with minimal energy expenditure utilizing a combination of the space station, lunar fly-by and aerobraking on Earth return. Round trips to the asteroid belt would take a year or more with stay times of weeks. If such missions are manned, as they might logically have to be, then the critical technologies involved are basically the same as those for proto-colonies in orbit and a manned Mars mission, discussed above. For similar reasons, then, asteroid belt exploitation is likely to have to wait until well into the next century, possibly past 2050.

b. Solar Science

Concepts behind the solar astrophysical segment of the Civil Space Program, if not the required funding, seem well in hand through the turn of the century and beyond. Of the eight concepts noted in Reference 5, only one, the Solar Coronal Diagnostic Mission (SCDM), cites any critical technology needs. A pioneering mission, the SCDM would, for the first time, investigate the structure, dynamics and evolution of the corona. Besides knowledge gained about the sun itself, the SCDM would also aid greatly in developing the ability to forecast the Earth's variable environment in space.

This reminds us of the value of the Solar Astrophysical Program not only in terms of the sun's effect on Earth but also in terms of being able to give adequate early warning to astronauts in space, on the Moon, asteroids or Mars, in the event of a high-radiation solar outburst. Such information is itself an example of critical technology to be mastered before the Civil Space Program can proceed confidently with the manned exploration of space.

6. EXPLORATION OF THE OTHER PLANETS, THE GALAXY AND THE UNIVERSE

NASA's Venus Atmospheric Probe would require high temperature resistant electronics and instrumentation, as well as resistance to high pressure and reentry conditions. These qualities appear achievable, however. The Cassini mission to orbit Saturn with close fly-bys of its many moons, including Titan, appears technologically feasible.

NASA's total astrophysical program would cover the spectrum from gamma ray to millimeter wavelengths. Of the various missions described in Reference 5, several are seen to require technology developments. The Advanced X-Ray Astrophysics Facility will need work in optics, detectors, cryogenics and pointing. The Shuttle Infrared Telescope will need, as other Shuttle-borne sensors do, protection against contamination from the Shuttle. And it will benefit from advances in millikelvin detector cooling subsystems, as well as in infrared detectors. The Large Deployable Reflector (LDR), which will make high resolution astronomical measurements in the band from submillimeter wavelengths to the infrared, will need advances in large (20 m) optics, and related technologies including control, cryogenics, and submillimeter coherent receivers. While these are challenges, comparable improvements are also likely to be of interest to DOD in the SDI Program.

In terms of future directions for the Civil Space Program, the QUASAT Project (27) is noteworthy in several ways. Not only will it engender important advances by the early 1990s in knowledge of compact galactic radio sources and in the technology of very-long-baseline interferometry, it also epitomizes international cooperation at the basic level of mutual technology transfer and fundamental tradeoffs between technological feasibility and conceptual alternatives.

The most important element of the orbital element of the QUASAT system, for example, is currently considered to be the 15 m (or larger) satellite antenna, since its design drives decisions about other major elements of the system. The antenna concept seen by the European Space Agency (ESA) is based on a new antenna development, i.e., a rigidized inflatable structure (RIS), while NASA would rely on existing technology and use a wrap-rib mesh, deployable reflector. Another important driver is the launch system selected since it sets the maximum dimensions of the undeployed system. ESA looks toward the Ariane, and NASA, the Shuttle.

C. SUPPORT INFRASTRUCTURES

1. TRANSPORTATION

a. Overview

The range of worthwhile possibilities for future space tramsportation development, detailed in the 2020 Report, is coming into better focus as a result of the NASA-DOD studies now under way. It would be premature, therefore, to do more than highlight what seems likely over the next few decades until what may be the next round of operational advances. The timing that can be expected is shown in Figure 16 (from Ref. 28). Present studies including detailed concept definition would last through 1988, developing specifications for space transportation systems becoming operational in the mid-1990s, and identifying critical technology needs for systems to be operational around the year 2005. By that time, new perspectives and lessons learned will likely have dictated a new round of studies. In the meantime, we shall have been developing our means of transportation for the space station and, quite probably, expeditions to the Moon, if not also Mars.

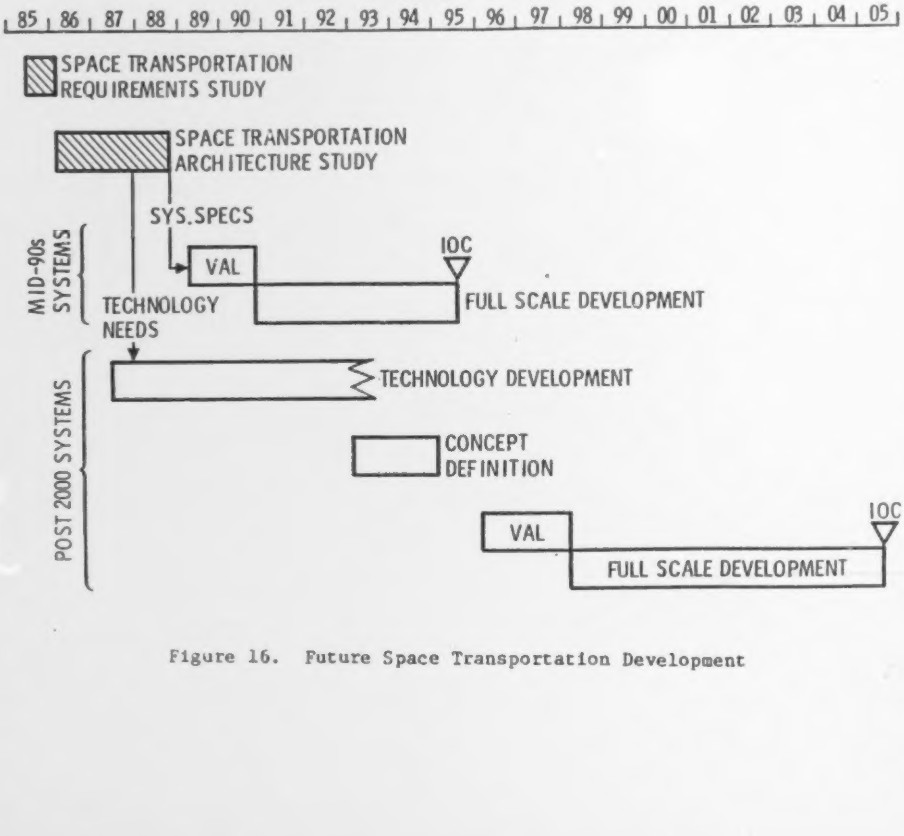
By far the most fundamental issues before us are those of cost and lift capability. Companion issues concern the proper mix of manned and unmanned systems and of reusable and expendable vehicles, respectively. Propulsion technology issues are, broadly speaking: liquid versus solid; liquid type; segmented versus monolithic solids; dual fuel and dual mode approaches. For first stages to be used in orbit-on-demand concepts, the principal issue is hybrid airbreathing engines versus rockets. Lastly, there is the issue of using so-called low, rather than high, technology to cut costs.

For the mid-1990s the basic launch vehicle options at present appear to be those in Figure 17 (28). Selections among these options will be based on manned versus unmanned requirements, maintenance of assured access to space, realistic appraisal of launch frequency and payload mass demands, and cost effectiveness as reflected in total life cycle cost:

Transportation costs to low earth orbit (LEO) are an important aspect of the space transportation architecture studies just initiated by the DoD and NASA. An ambitious objective of these studies is to define the management, vehicle, and ground systems that can reduce operational launch costs by one or two orders of magnitude as projected in Figure 18. While the solution is not yet defined, we can expect the large cargo launchers or tankers that evolve for turn-of-the-century missions to move toward these goals. These low-cost operations will depend on the growth of launch requirements to significantly higher rates than today. Technical and production efficiencies must be matched by more streamlined institutional management as space launches become "everyday events."

b. Next Generation Shuttle

NASA (29) sees the present Shuttle as good through the year 2000 with a manned Shuttle II thereafter. The latter would be a personnel carrier (10 to 25 people) with limited (10-15,000 lb) cargo capacity. It would be designed ideally for a few days (hours?) turnaround, a 15-person ground crew, all-weather operations, and, like the Shuttle designs advocated by NASA originally, be totally reusable with a target cost of under $100 a pound. Currently anticipated transportation costs to low earth orbit (LEO) are shown in Figure 18 (28).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SPACE TRANSPORTATION REQUIREMENTS STUDY
SPACE TRANSPORTATION ARCHITECTURE STUDY
SYS.SPECS
MID-90s SYSTEMS
VAL
IOC
FULL SCALE DEVELOPMENT
TECHNOLOGY NEEDS
POST 2000 SYSTEMS
TECHNOLOGY DEVELOPMENT
CONCEPT DEFINITION
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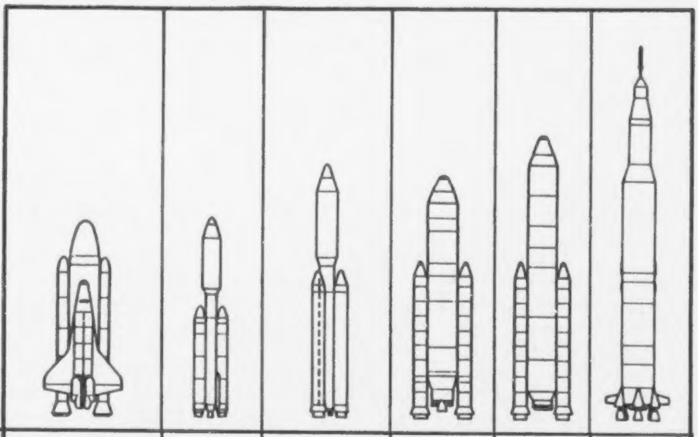
FULL SCALE DEVELOPMENT

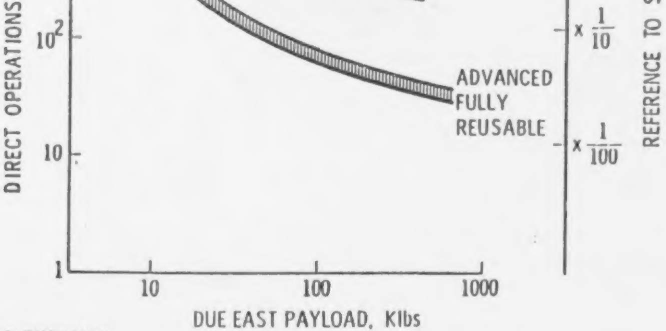
Figure 16. Future Space Transportation Development



CAPABILITY, lb	SPACE SHUTTLE	CELV	ELV GROWTH	SDV-2R	SDV-3R	SV*
LEO 87.9°	35K	33K	130K	120K	150K	200K
GROSS LIFTOFF WEIGHT	4.5×10^6	1.9×10^6	5.5×10^6	3.9×10^6	4.5×10^6	5.9×10^6
THRUST	7.5×10^6	3.2×10^6	7.5×10^6	7.0×10^6	7.5×10^6	7.5×10^6

*Saturn V for reference only

Figure 17. Circa 1995 Launch Vehicle Options



* PAYLOAD SHROUDS NOT INCLUDED

Figure 18. Transportation Costs to Low Earth Orbit

c. Orbit on Demand

The notion of orbit-on-demand space transportation can be said to have its roots in the Dyna-Soar studies predating Sputnik. The concept, discussed in the 2020 Report, would allow rapid access to orbit. Takeoff would be horizontal (HTO) or vertical (VTO), depending on the design, and landings would be horizontal at, hopefully, conventional airfields.

Thirteen HTO and eight VTO design concepts were compared in recent detailed studies by NASA-Langley (30-33) for a given 5000-payload. The best VTO design had a gross lift-off weight (GLOW) of 313,000 pounds, less than half of the GLOW of the best HTO design, i.e., 756,000 lb. Gross weight is not all the story, however. Relative costs as well as relative needs for technology development--especially in propulsion, materials, thermal control, and structures--also play a significant role in making a final decision. So do the mission requirements such as turnaround time and the potential problem of delivering sonic booms over populated areas. Yet the state of the art has apparently progressed to the point that DARPA has recently endorsed a strong push with related technology toward at least a supersonic transport by the late 1990s. An orbital version would likely take another decade, although more optimistic projections are available.

d. Heavy Lift Launch Vehicles (HLLV)

A current prospectus for HLLV evolution into the post-1995 time period is shown in Figures 19 and 19a. Shuttle-derived vehicles (SDV) would parent the sequence in the next ten years into the 200K-lb payload class. A 400K class HLLV, however, such as might be associable with the SDI program, would not be available until after the year 2000.

e. Orbital Transfer

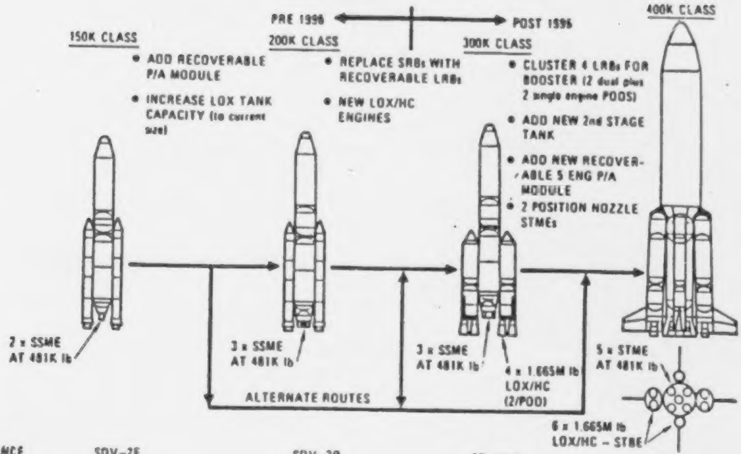
Great strides, consistent with the picture given in the 2020 Report, have been made by NASA with respect to orbital transfer vehicles (OTVs) and can be expected to continue (34). Figure 20 depicts a likely evolution of OTVs through the year 2005.

Conventional OTVs are being upgraded. The reliability of the inertial upper stage (IUS) has been upgraded, and modified Centaur upper stages will (depending on the configuration and the launch vehicle) offer payload capabilities of 10,000 to 13,000 pounds to GEO--considerably in excess of the 5000-lb capability of the IUS. An advanced high-energy upper stage (HEUS), using liquid and/or solid propellants, may be required in the future to support missions with still higher payloads, whether for DOD or NASA.

OTV-related concepts and technological challenges over the next 20 to 50 years are many. Following is a collection of some examples. In cryogenics: on-orbit restartable engines of the Space Shuttle Main Engine (SSME) class; orbital transfer of cryogens from storage to vehicle, integral, reusable cryogenic propellant tanks, and solar-powered reliquefaction systems. In solid propulsion: very high energy (360 s delivered specific impulse) high-mass-fraction "staged" motors with start/stop pulse motor technology for orbit transfer. In earth storable propulation systems: the use of lasers, metastable helium, and strap-on boost modules--as may be needed, for example, to properly dispose of derelict satellites.

In the future greater attention than heretofore may be placed on spacecraft integral propulsion systems as an alternative to conventional upper stages such as IUS and Centaur. Projected advantages--all seemingly cost effective--include simplification of interfaces, elimination of separate upper stage electronics, tailoring to the unique needs of the spacecraft, and less expensive integration with the Shuttle. On the other hand, the ultimate value of integral propulsion depends directly on the amount of use a given integrated configuration will receive.

A space-based orbital transfer vehicle (OTV), using the space station (as shown in Figure 21) would be a next logical step. Key technologies, as already noted in the 2020 Report, include not only cost-effective propulsion


PRE 1996
POST 1996
150K CLASS
• ADD RECOVERABLE P/A MODULE
• INCREASE LOX TANK CAPACITY (to current size)
200K CLASS
• REPLACE SRBs WITH RECOVERABLE LRBs
• NEW LOX/HC ENGINES
300K CLASS
• CLUSTER 4 LRBs FOR BOOSTER (2 dual plus 2 single engine PODS)
• ADD NEW 2nd STAGE TANK
• ADD NEW RECOVERABLE 5 ENG P/A MODULE
• 2 POSITION NOZZLE STMEs
400K CLASS
2 x SSME AT 481K lb
3 x SSME AT 481K lb
3 x SSME AT 481K lb
4 x 1.665M lb LOX/HC (2/POD)
5 x STME AT 481K lb
6 x 1.665M lb LOX/HC – STBE
ALTERNATE ROUTES

PERFORMANCE	SDV-2E	SDV-3R	SD-HLV	HLLV
LEO (160 nm/28.5°)	145K lb	195K lb	300K lb	400K lb
LEO POLAR	110K lb	160K lb	250K lb	345K lb
1000 KM POLAR	90K lb	135K lb	210K lb	300K lb
GEO	19K (W/Centaur G')	50K lb (W/OTV)	68K lb (W/OTV)	

Figure 19. Heavy Lift Launch Vehicle Evolution

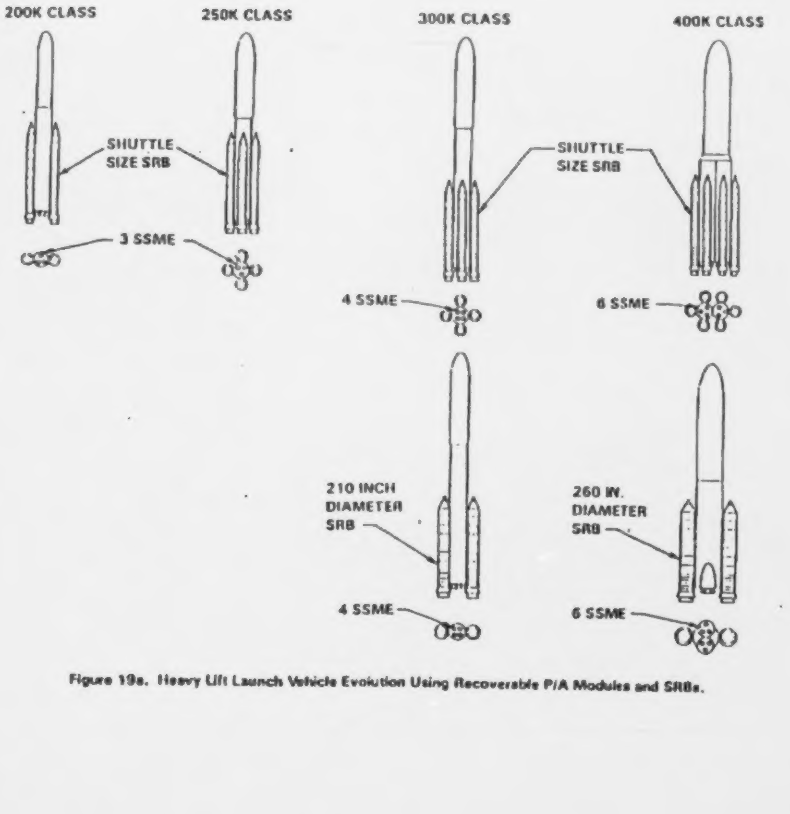

200K CLASS
250K CLASS
300K CLASS
400K CLASS
SHUTTLE SIZE SRB
SHUTTLE SIZE SRB
3 SSME
4 SSME
6 SSME
210 INCH DIAMETER SRB
260 IN. DIAMETER SRB
4 SSME
6 SSME

Figure 19a. Heavy Lift Launch Vehicle Evolution Using Recoverable P/A Modules and SRBs.

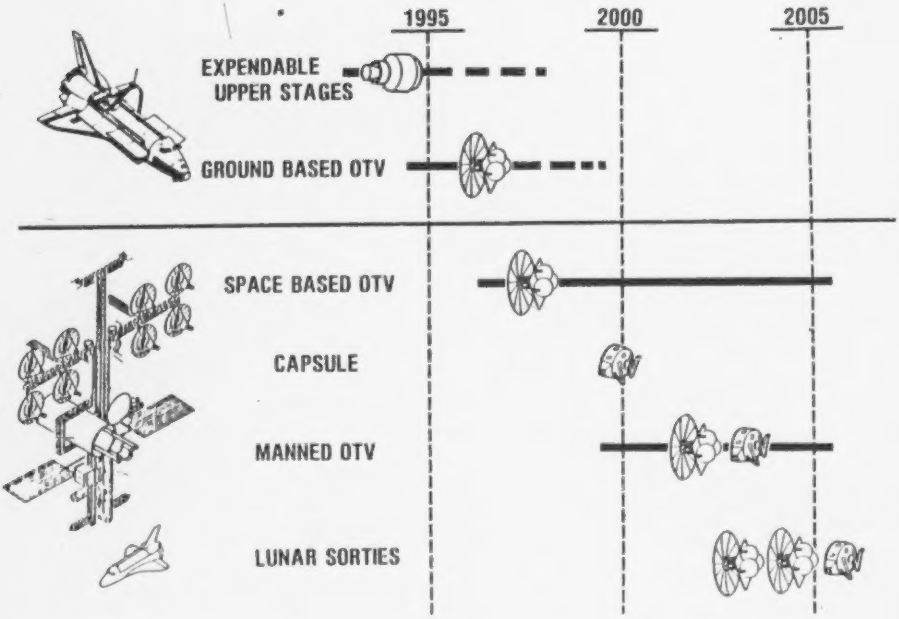

1995
2000
2005
EXPENDABLE UPPER STAGES
GROUND BASED OTV
SPACE BASED OTV
CAPSULE
MANNED OTV
LUNAR SORTIES

Figure 20. Orbital Transfer Vehicle Evolution

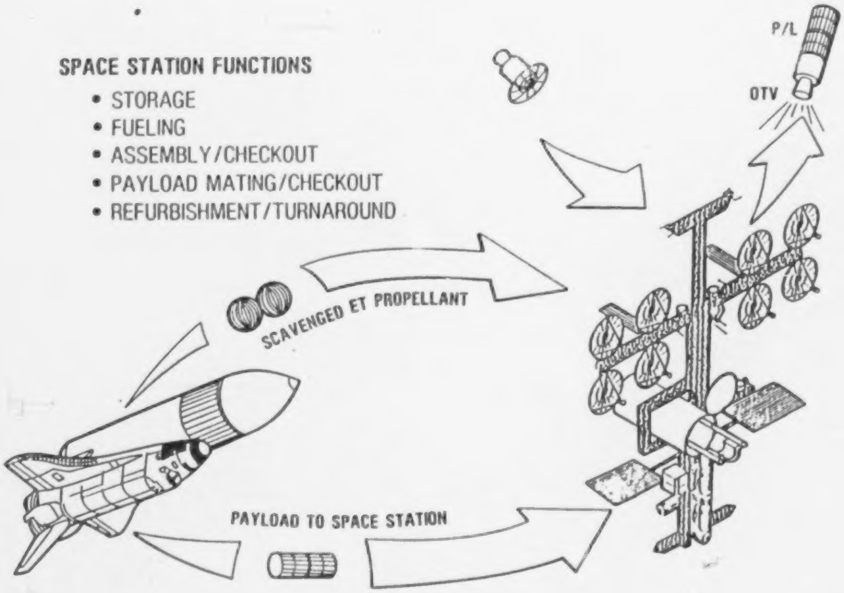

SPACE STATION FUNCTIONS
• STORAGE
• FUELING
• ASSEMBLY/CHECKOUT
• PAYLOAD MATING/CHECKOUT
• REFURBISHMENT/TURNAROUND
P/L
OTV
SCAVENGED ET PROPELLANT
PAYLOAD TO SPACE STATION

Figure 21. Space Station Functions

but also long-term cryogenic storage, with a suitable OTV depot, storage, maintenance, repair and payload integration provided on the station. The Shuttle would deliver the payload (together with scavenged fuel from the external tank (ET), if appropriate). The payload (P/L) and OTV would be mated, checked out and launched toward higher orbit or to the moon, asteroids, or planets.

Part of the payload will at times include humans. It will therefore be necessary to plan, design and build a family of manned capsules, depending on the destination and operations intended. If the trip is to a man-tended GEO station for periodic checkout and refurbishment, for example, then a capsule amounting to a manned extended version of an Orbiting Maneuvering Vehicle (OMV) will be desirable. Design of a first-generation, unmanned OMV (Figure 22) is under way with development set to start in March 1986 and first launch planned in 1990. Although able to effect orbital transfer, an OMV is clearly more than an OTV. Besides incorporating high degrees of automation and robotics, it will be remotely controllable with all that that implies, e.g., reliable communication links, sensors, grappling and holding arms, spare parts, etc.

Thus, for example, an OMV would be crucially important for orbital emergency control, such as damage assessment, near-by space object surveillance and close-in inspection, treaty monitoring, diversion of possibly threatening debris and derelicts, repair, refurbishment and, if necessary, rescue. OMV technology will be vital as well to the success of a manned OTV such as that mentioned above. As such, the development of an eventually highly sophisticated OMV capability would be essential to both the Civil and National Security Space Programs.

By the year 2030, large-scale versions of an OTV will need to be developed, along with suitable expansion of the space station, for trips to the moon or Mars, either directly or via other, interplanetary, stations that would themselves have had to be developed and deployed in the meantime.

Return of an OTV from high orbit, e.g., GEO or beyond, to the space station or to Earth means getting rid of the excess velocity involved. For example, an OTV returning from GEO has about 7000 fps of velocity more than that needed to be in LEO. Rather than offload valuable payload to provide

- **REUSABLE REMOTELY-CONTROLLED VEHICLE**
- **PROVIDES DELIVERY, RETRIEVAL & BOOST CAPABILITY**
- **EXTENDS STS RANGE TO 1500 nm & ± 8° PLANE CHANGE**
- **PHASE B UNDER WAY**
  - LTV
  - MARTIN MARIETTA
  - TRW
- **INITIATE DEVELOPMENT PHASE MARCH 1986**
- **FIRST LAUNCH 1990**

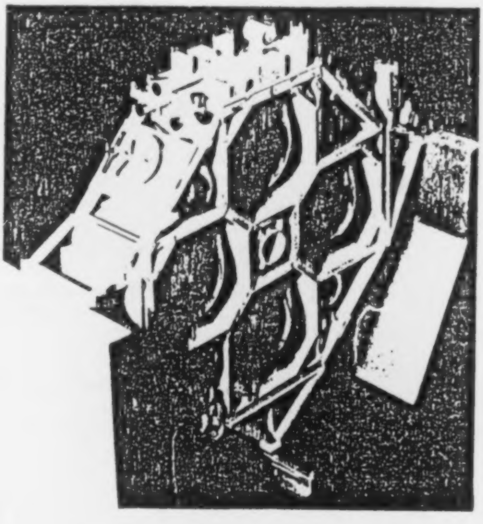


Figure 22. Orbiting Maneuvering Vehicle

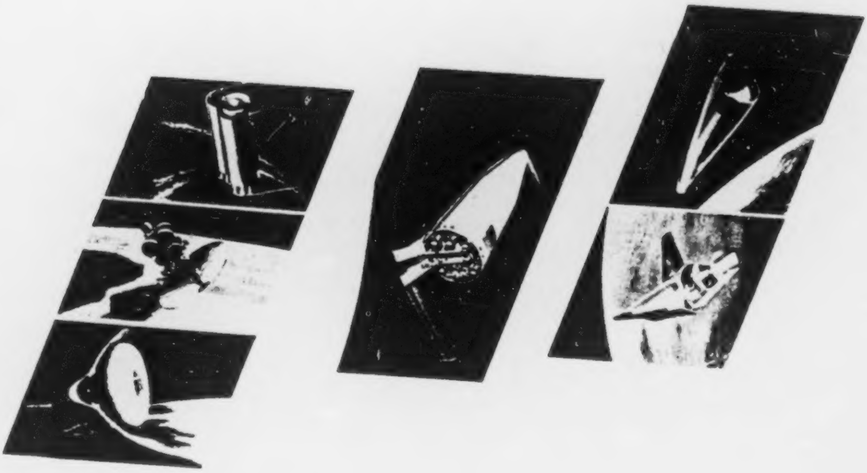


Figure 23. Aeroassisted OTV

retro-rocket fuel, aerobraking technology on the OTV will use atmospheric drag to slow down (Figure 23). Different approaches, along with their implications for thermal protection, structures, material, guidance, navigation and control are under study by NASA. Applications of advanced aerobraking technology are also highly pertinent to the Venus Atmospheric Probe and the Mars landings mentioned previously.

NASA attention is also being paid (23.b and 23.c) to the use of long tethers in space for, among other applications, orbital transfer. The idea is to rotate the tether such as to speed up the payload at the other end by the required amount and then release it. Alternatively, a rotating tether, properly phased, would be able to attach to an arriving payload and thereby effect rendezvous. Advantages to the Shuttle are seen by using a tether to lower the external tank (ET), release it on a timed backswing and thereby deorbit the ET precisely while transfering useful momentum to the Shuttle and its consequently increased payload. Tether lengths of tens to hundreds of kilometers are envisioned. Critical technologies include tether structure, materials and control.

f. Mass Drivers

Thought, as noted in the 2020 Report, is still being given to the prospects of mass drivers. The proceedings of the 1985 SSI/AIAA/ Princeton Conference on Space Manufacturing, previously cited, discuss most recent thinking on mass drivers based on Earth as well as on the moon. Related high-acceleration technologies would be of interest to the SDI program.

2. CONSTRUCTION, LOGISTICS AND SERVICING

a. Overview

The 2020 Report comprehensively discusses construction, logistics and servicing as it applies to space. We point out some highlights here that signal interesting new developments.

b. Earth Surface

The growing size of satellites means corresponding growth in ground test of facilities. NASA is contemplating one large enough to accommodate a half-scale model of the space station. Ground simulation of the zero-g orbital environment, at least in part, is well understood. In view of the expense and difficulty of the full-scale testing and evaluation (T&E) in orbit of large space structures that will eventually have to be done anyway, it is manifestly worthwhile to pursue earth-based T&E techniques as far as possible. In short, in the area of T&E, the problem is basically one of scale.

Launch and recovery facilities should be carefully considered, especially from the standpoint of the environment and public interest. The high rates of launch projected for DOD and NASA may imply unacceptable rates of atmospheric pollution. The sonic booms from departing or returning horizontal takeoff and landing demand-on-orbit vehicles may limit the location of operational airfields to coastal locations, with takeoffs and landing approaches restricted to over the ocean. Launch of nuclear reactors and their possible Cosmos 154-like return is more likely to raise public concerns today than five years ago. The logistics of rocket fuel supply constitute a major undertaking today involving many truckloads of highly explosive material traveling on public highways from the production plants to the launch sites. Increased space traffic will mean increased ground traffic and with that, inevitably, increased danger of toxic leaks, blow-ups and adverse public reaction to the Civil Space Program. It may become necessary, therefore, to relocate production facilities significantly closer to the launch sites. Realistic consideration of these and other, similar issues, may decisively affect the design, if not the basic feasibility, of many future concepts.

c. Earth Orbit

As has already been pointed out, two basic elements of construction, logistics and servicing in Earth orbit are a suitably designed and equipped space station and an advanced space transportation system comprising not just the present Shuttle and its follow-ons but also a family of OTVs and OMVs.

Another basic element, and perhaps an area of critical technology, is that of human support, to be discussed later. Improvements are needed in extravehicular mobility for members of the space crew to work effectively and with adequate safety in the face of extreme environmental conditions.

One of these conditions, as the 2020 Report points out, is that of orbital debris. Conditions have worsened in the last five years, for nothing in the way of prevention or cleanup has been begun, beyond discussions. The discussions have been valuable, of course, because they have gradually been serving to educate the community. In the U.S., for example, NASA conducted a workshop in mid-1982 (35). The results were not published, however, until 1985 and then only after having been presented at a COSPAR conference in Austria. Meanwhile, the subject has regularly been treated at recent congresses of the International Astronautical Federation as part of the International Symposium on Space Safety and Rescue.

In short, there is a mounting risk that the space station will be damaged, possibly disastrously, from orbital debris unless preventative measures are taken. These would range from steps comparable to micrometeroid protection to diversion or capture and disposal of large objects, including derelict satellites. An associated task is that of surveillance of space objects, on a much higher scale of resolution than presently available.

Lastly, there is the need to provide for handling the logistics of human emergencies. NASA has plans (to be discussed later) for a so-called space ambulance, for example, and these should be perfected.

The foregoing discussion has emphasized the negative potential inherent in any societal undertaking, such as that which a permanently manned space station will represent. The intent is not to discourage but rather to point out the kinds of risks that common prudence and realism dictate be countered.

d. Interplanetary Orbit

Resonant orbits between Earth and Mars can be defined at least in principle, such as to encourage thinking about eventually establishing a complex of permanent, interplanetary logistics platforms, should it become appropriate to commit to a permanent human colony on Mars. For a given platform, transfer times as well as the timing of transfer opportunities, would depend on several factors, e.g., the relative placing of the platform orbit, the relative phasing of the planets and the platform in their orbits, gravity effects of planets on the platform during its encounters, etc. One-way transit times would be 8 to 9 months at a minimum and, in some cases, a matter of years. So that, over a decade, the number of transfers of personnel, supplies and equipment on each platform would be relatively few. Multiple platforms and orbits will be needed, therefore, particularly if the need is for frequent visits, i.e., at least once a year.

The question then arises of the relative cost effectiveness of this approach compared with that of direct flight as needed. In either case transportation to and from a planetary surface is necessary for the same payload, and by the time an "orbital chain" of platforms is ready to be established, a significant amount of practical experience with and operational capability for direct flight will have already been acquired at a substantial sunk cost. Moreover, the platforms themselves would each constitute the logistical equivalent of a colony with its own continuing needs for repair, resupply, human support, etc., over and above those of the main objective of the entire mission: the colony on Mars. In short, is the overhead of an "orbital chain" worth the effort?

A detailed, thorough-going cost-effectiveness comparison of the two approaches is certainly in order, before an informed choice is possible, and that comparison will itself have to wait until we are better informed about long-term human needs in orbit, hopefully as a result of our experience with the space station.

3. MISSION CONTROL

Earth orbit mission control has, of course, been well in hand for many years. The tracking and data relay satellite (TDRS) system is being deployed and upgrades are in the works. Mission control of lunar expeditions presents no fundamental problems either.

With the advent of the space station, a substantial amount of mission control will probably be desirable to have in orbit, at least as an option. The commander of the space station will be fundamentally no different in terms of responsibilities than his military counterparts on Earth, and he or she will have to exercise those responsibilities on the basis of the information and action options that an Earth-based mission control facility represents.

On interplanetary missions, when the signal delay time to and from Earth becomes appreciable, delegation of mission control authority to platform and/or colony commander becomes a practical necessity. But, as previously noted, this may mean the equivalent of having to reduce the size (and weight) of, say, the Mission Control Center at JSC by a factor of 1000 or more.

Orbital deep space relays such as NASA plans, will also be required to assure communications links to Earth.

V. SPACE SYSTEM TECHNOLOGIES

A. OVERVIEW

System technology areas overlap and exist at different levels relative to each other. Information processing and communications both concern signal processing. Structures and materials both bear on thermal control. Information processing, guidance, navigation and control, and sensing all enter into autonomy and automation, including robotics and artificial intelligence. Human support overlaps with these and a host of other technologies besides adding unique features of its own. The breakout pursued below, therefore, is somewhat arbitrary, although hopefully comprehensive enough to be useful.

The preceding discussion of system opportunities attempted to highlight what presently appear to be critical, i.e., enabling, technology areas that would merit pursuit. It cannot be overemphasized, however, that technology systems and mission requirements mutually interact in an iterative way. A requirement or system concept can push technology developments, while technology advances can lead to new concepts and requirements. Or, sometimes, they serve to revive some old concepts whose time has finally come. The overall status and the tradeoffs between them must be regularly re-examined and, it must be added, the total costs and impacts involved reassessed. What looks today to be a critical technology for a particular concept may not be critical tomorrow if that concept is rejected or the mission can be done some other, more preferable way.

B. INFORMATION PROCESSING

1. INTRODUCTION

Information processing can be broken down in several ways. The breakdown chosen here is hardware, software, and system simulation.

Increasing amounts of onboard processing will be called for in the upcoming decades such that new architectural approaches must be taken. Flexibility, throughput and use of parallel processors have to be traded off. Programmable distributed (i.e., multiprocessor) architectures are now being developed; these require significant advances in data bus transfer rates as well as in control or executive processing--an area that extends to autonomy and automation.

2. HARDWARE

The highest degree of computer system reliability and availability is mandatory, especially for long flight time missions where autonomous control is needed and even more so where humans are in the spacecraft. This requires fault-tolerant computers whose hardware architectures and software strategies use redundancy, automatic error detection and correction, and recovery. No long-life (10 years) fault-tolerant computer currently exists. However, by the year 2000, electronics with speed-power products of 2-5 picojoules are attainable. Substantial tolerance of fatal dose levels are also attainable, although increasing protection against single event upsets (SEU) from cosmic rays will have to be provided, especially as feature sizes drop down to 1 micron.

Memories by then should exceed present storage capacity by almost two orders of magnitude.

The demand for large amounts of onboard memory capability is growing rapidly, so that such growth may come none too soon. All sensing satellite applications--passive and, especially, active--can be greatly enhanced by increasing the amount of onboard data processing that can be done before relaying the result to ground-based facilities or space-based control centers. Additionally, the sensing satellites would be able to process signals from Global Positioning System (GPS) satellites and so determine their position and timing to a high degree of accuracy. This too will require sufficient memory and processing capability.

Significant payoffs will likely come from use of optics. The far term will see hybridization of hardware through use of both electrical and optical techniques, e.g., optical processors, fiber optics, acoustic optical devices. For example, Thimlar et al (36) project a processor capability of 10-100 billion operations per second or more by the year 2000, if not sooner.

3. SOFTWARE

Software is an actionable representation of logic. As such, it embodies a basic element of artificial intelligence (AI). Often, however, the logic actualized may not be the logic intended, so that as software programs grow in scope and complexity, so does the task of checking their validity. Ways must be found to do so comparable in directness, swiftness and simplicity to validating the algorithm 1 + 1 = 2. AI-related applications such as a fully automated Mars Rover will therefore require many fundamental advances, not the least of which will be the ability to check out the substantial number of lines of software required. For example, an AI-related application such as adding autonomy to a spacecraft may add tens of thousands of lines of software that might otherwise not be there. By 2030, however, it seems reasonable to predict the satisfactory techniques of validation will have been developed by DOD, if not elsewhere.

As with software in general, the technology concerns of artificial intelligence are not restricted to space applications. Although much progress has been made in this field, large technological breakthroughs are still required. The "learning" machine has not been generated except for a few isolated and specific applications, i.e., general techniques for non-monotonic logic and reasoning with uncertainty have not been produced. Also, a true symbolic architecture including generalized symbolic representation and signal-to-symbol conversion techniques is still required.

When some of the above problems are solved, it will introduce the need for high-speed, symbolic machines, new storage and retrieval techniques, and algorithms for segmenting the AI programs for parallel processing. AI applications will span all aspects of space technology, including mission planning, simulations, onboard processing, and satellite specific data processing applications.

Concerns with increasing costs of software (like those of space transportation) will drive the creation and use of formalized software development techniques. For example, DOD's higher order language ADA, offers significant cost savings due to its modularity and portability, which means system-to-system portable software and therefore lower overall software costs.

By the year 2030, algorithms will necessarily be greatly upgraded, largely due to increased autonomy and to increased onboard processing demands. Satellite control along with payload processing presently done on the ground will be done (entirely in some cases) on board. Making this transition will represent a major effort. Onboard throughput capability by the year 2000 should be 3-4 orders of magnitude higher than today in the terms of millions of instructions/operations per second (MIPS and MOPS, respectively).

4. SYSTEM SIMULATION

Here we take the term system simulation to mean that aspect of information processing devoted to system modeling, design, analysis and control. In this case the system is not just a space system but could be, for example, a system such as the Earth's biosphere. A well-founded and complete system simulation is essential to making informed decisions toward the achievement of desired goals and objectives.

The more detailed the simulation, especially insofar as it provides insight to the system's performance and its impact on society, the more valuable it becomes in choosing between alternative concepts, approaches or courses of action. The more complex the system, the more complex the software required. In the next decade, let alone those that follow, system options of greater and greater complexity will appear with increasing frequency. For example, many options are already seen for a manned Mars operation that may not take place for another 40 years.

It will be increasingly necessary to have a near-real time capability for computer-aided design/engineering (CAD/CAE) to model, design and analyze those alternatives, especially to identify their technological, operational or economic sticking points. Similar statements apply to investigations into the earth's biosphere, where rapidly accumulating knowledge has forced progressive upgrading of component models and raised new questions, while enhancing understanding of the consequences involved and the rising urgency of the problems revealed.

In a like manner, the commander of a manned space system, especially one remote from Earth, will have to simulate that system in one way or another on a day-to-day basis. This is done regularly for earth-based control of systems, e.g., remote salvage and restoration operations. It will certainly be needed for space-based control, accompanied by the need to shrink the size of the computers used.

As Likins (37) sees the situation for future spacecraft control problems: it is extremely important and yet very difficult to devise before launch a mathematical model that incorporates the salient dynamic features of a spacecraft. With an eye on the future, we must pursue a development strategy to mitigate control problems in three ways. First is to devise and compare computer simulation programs that permit rapid, accurate and efficient representations of the dynamic response of spacecraft models of realistic complexity. See, for example, recent progress reported by Gluck and Sridhar in Reference 38. Second, deployed spacecraft must be tested on orbit to measure those characteristics not amenable to ground test, and to adjust the models accordingly. Third is to devise and evaluate methods for attitude control either tolerant of or that can accommodate model errors.

One can therefore project continuing and substantial improvements in simulation capabilities in the decades ahead, coupled with an improvement in understanding of the limitations. The rate of improvement, however, will obviously depend on the support it receives.

C. GUIDANCE, NAVIGATION AND CONTROL

1. OVERVIEW

Guidance, navigation and control (GNC) involves the general functions of determining the position of the object (navigation), guiding it to a specified position (guidance function), and the control of the object. In the following discussion, only a few issues relevant to GNC are discussed and include: lifetime, pointing control, autonavigation accuracy, and large space structure control. Other elements relating to GNC such as autonomy and automation, information processing and atmospheric flight, are discussed elsewhere.

2. LIFETIME AND POINTING

With every new system there appears to be a requirement for increased life. Lifetimes in the seven to ten year range can generally be achieved by appropriate system design. Sometimes, design to lifetime requirements may result in significant increases in weight or power requirements, with consequent cost implications. This can lead to very difficult tradeoffs. Long lifetimes of GNC systems beyond seven to ten years might require parallel rather than traditional single string approaches.

Currently, there are sporadic individual small efforts throughout industry to improve certain aspects of mechanism design that are perceived to be long-life problems. Other potentially life-enhancing technologies could be singled out as well and include: low thrust propulsion systems, gyros, reaction wheels, CMGs, etc. Long life implies not only reliable componentry, but conservative design as well. In general, there is no explicit technology program that exists that is aimed at GNC systems with long life times.

Since the early 1970s there have been dramatic improvements in pointing control accuracy from 200 arcsec (NIMBUS IV) to 8 to 10 arcsec of Advanced Technology Satellite (ATS) and the OSO of the mid-1970s, to a projected capability of 0.01 arcsec (1) for the inertially staring Large Space Telescope (LST) in the mid-1980s. For spacecraft in an agile environment, or spacecraft subjected to large disturbances or both, or spacecraft of large extent, holding pointing control accuracies to 0.01 arcsec will prove challenging.

Similarily, the trend in pointing stability (jitter), based on OAO-2, OSO IV, OAO-6 and LST is of the order of 0 005 arcsec with pointing stability rate trend better than 0.2 arcsec/sec.

3. AUTONAVIGATION ACCURACY

As noted in the 2020 Report, operational spacecraft and transportation vehicles will be able to use one or more or a combination of means for autonomous navigation. These would include the Global Positioning System (GPS) when in Earth orbit as well as navigation schemes that make use of near-body information such as the Earth or Moon. If several orbiters have been established around the moon or Mars and properly equipped beforehand--as Bekey suggests--they might be usable as GPS-type satellites for the sake of incoming landers. Thought should also be given to applying the inverted GPS principle to navigation near the Moon and Mars. That is, a suitable array of four (or more) GPS-like transmitters can be implanted on the surface, accurately surveyed and their individual signals coded accordingly. Incoming vehicles and orbiting platforms can then obtain instant position, velocity and time fixes with great accuracy, i.e., meters and nanoseconds. The landers could also carry terrain-following or map-matching radars for relatively accurate descent (a few km), providing a sufficiently accurate map of the terrain has been developed by precursor missions.

Autonavigation techniques for aeroassist, aerocapture, and aerobraking are essential to ensure dynamic stability, achieve the desired lift-to-drag ratio, and avoid overheating. For Mars, where the atmospheric density varies by 20 to 25 percent over the year, the additional problems entailed will have to be overcome by appropriate reentry design and control system flexibility, possibly coupled with timing the descent to occur when the atmosphere is thicker and the payload savings would be greater.

4. LARGE STRUCTURE CONTROL

Large structures in space will include not only extensive arrays of truss-like beams, solar panels, or mirror components, they could also comprise wide-spanning thin films as well as deployments of tethers measuring tens to hundreds of kilometers. A high resolution synthetic aperture radar might utilize a relatively narrow but lengthy (100s of meters) structure that scans by rotating, rather than using a large dish. Each concept brings its own needs for control.

Since the 2020 Report, active research to understand and solve problems of large structure control has increased in both NASA and DOD, individually and cooperatively. For example, a cooperate AFWAL-MSFC program (VCOSS II) is under way for laboratory testing of sensors and actuators in a real-time flexible mode of control under dynamic environmental inputs. It will lead to a flight test phase wherein dynamics and control experiments would fly on NASA Langley's Structures Test and Experiment Platform (STEP) by the 1990s. Also, NASA Langley's COFS (Control of Flexible Structures) program will correlate flight experiments to ground tests and to analyses. Requirements that these programs are striving to meet typically are a line-of-sight stability better then 0.2 of the diffraction limit, a defocus tolerance of 10 wavelengths, and a RMS surface error quality of 0.02 of a wavelength, but the exact requirements depend on the particular mission.

However the ultimate technique of control is engineered, it will have had to overcome a host of possible disturbance factors. These include forces and torques resulting from imbalances in cryocoolers, control moment gyros, reaction wheels, sunshade mass shifts, solar pressure, and gravity gradients.

Coolants will disturb through mass shifts and turbulence, while solar array drives and reaction wheel bearings will produce noise. Onboard propulsion subsystems obviously contribute as well, as does thermal distortion, although thermal-induced effects are lower frequency phenomenon.

Ground test methods should see significant improvement by this time and their relationship to orbital behavior will be understood. However, this will not eliminate the need for flight tests of the complete structure. Instead, the value of flight tests will be enhanced and their cost reduced by minimizing change, should flight test results indicate lower performance than required.

By 2000 and certainly by 2030, a broad knowledge should be in hand as to the engineering fundamentals of large structure control, including the lessons of practical experience. Like many other areas of future space technology, however, it will require developing a new class of engineering expertise, one based on hands-on experience in orbit.

D. AUTONOMY AND AUTOMATION

The 2020 Report projected the future use of autonomy and automation, including man-tended operations and the use of robotics, to accomplish such fundamental functions as automatic fault-tolerant system control, space base servicing, fluid resupply, health monitoring, and so forth. It noted particularly that autonomy requirements (to which we now add those for automation) will influence the basic design and operation of all space systems in the 2020 time period both because of increased operational dependence on space systems and because of the requirement to protect the limited resources of the orbital environment. Those observations still apply.

Space system autonomy and automation are alike in that both may be defined as the ability of the system to perform a stipulated set of operations without human intervention, but to accept valid external commands when given. The difference is a matter of degree. In its simplest, most familiar form today, autonomy can be represented by the automatic pilot on aircraft. More complex is space system autonomy, which extends to satellite maintenance (including fault detection and correction), to navigation and orbit control, and to mission functions. Such autonomy is exemplified by Jet Propulsion Laboratory (JPL) spacecraft such as Viking, Voyager and Galileo.

For many years to come and perhaps indefinitely, the most precious commodity on space missions will most probably be crew time. Maximum utilization of this resource can be attained by making the routine operation of equipment as autonomous as possible. If the crew is relieved of the need to conduct or oversee routine operations they can be more available for productive activities. Inevitably it will be necessary to trouble shoot and problem solve in regard to equipment failure and unforeseen situations. The long two-way flight time characteristic of planetary missions will make it difficult to make use of the ground control team in quick response situations. In such cases, expert systems on board the spacecraft will be essential in support of crew member decision making.

As the operations become more complicated, autonomy can be said to blend into automation. In its most complex form, automation can be represented by robotics and ultimately by what is presently called artificial intelligence (AI). For example, a Mars Rover that can fully perform all the operations of site assessment such as mineralogical prospecting and processing, as would a human, would have to be fully endowed with all the attributes of human intelligence including pattern recognition, reason, memory, ability to learn and improvise, and (one can argue) intuition, aspiration, self-reference and the ability to rejoice. In other words, it would be a sort of geologist's 3CPO. At this far end of the spectrum, it becomes fundamentally difficult to describe artificial intelligence because it is fundamentally difficult to describe natural intelligence.

Not surprisingly, therefore, there is a general uncertainty as to what space system autonomy and automation is about, and the uncertainty varies directly as the complexity of the operations demanded increases. By the same token, there is uncertainty about the proper role and optimum location of humans "in the loop," although there seems general agreement that the total absence of any human control at all, is undesirable.

At the same time, the general article of faith is that increased autonomy and automation, especially robotics, will reduce the overall expense of operations that otherwise require costly human labor. Thus, Congress recently mandated a study of automation and robotics as applied to the space station, to see what savings as well as societal benefits might result (9). Similar views obtain with regard to current DOD-NASA space transportation studies where one aim is to cut costs, in part by eliminating most of the "standing army" associated today with ground operations.

Undoubtedly, in the next 50 years, increases in the operational complexity achievable by automated devices, quasi-independent of human control, will have an increasingly profound effect on society, not to mention the space program. A major factor will lie as much in the continuing shrinkage in size of information processing hardware as in the increasing power of software. Greater still will be the implications for society of concomitant advances in understanding the nature and content of human intelligence.

Such advances are intrinsically hard to predict because to do so consists of intelligence trying to understand itself in an objective way. As a result, although one might be able to measure and forecast progress in terms of the hardware and software involved, there is as yet no convenient summary metric established by which one can project the future of autonomy and automation with any direct meaning, beyond that of the elimination of jobs and the rise of technological unemployment. To be sure, one can point to faster techniques of mission planning and computer-aided design and engineering, and postulate measures such as speed and manpower (39). But it is questionable whether such techniques constitute advances in artificial intelligence rather than merely excellent progress in computer architecture which has been long overdue.

It is easier to predict that in the next half-century, the Civil Space Program will have provided substantial insights through the creation of autonomous space and ground systems that can operate in ways considered human-like but under human control. In that sense, the Civil Space Program may ultimately make its greatest contribution to the understanding of what and who we are.

E. SENSORS

The projections given in the 2020 Report are consistent with developments during the past half-decade and appear to be still valid. Sensor technology covers the entire spectrum of electro-magnetic radiation.

In the area of imaging systems alone, the performance and characteristics of an optical system may be described in terms of at least eight figures of merit. In general, we can expect substantial increases in practically achievable sensitivities and resolution. In the optical regime, these will be brought about by combinations of such things as larger, lighter-weight apertures, adaptive optics, improved extraneous light rejection, better coatings and optical filters and, importantly, control of surface contamination—a problem affecting thermal control as well.

For the infrared, one can expect significant improvements in detectors, both intrinsic and extrinsic. Array sizes in the mega-pixel range and higher will be achieved, partly through advances in the technologies of signal processing (i.e., "Z" or three-dimensional as opposed to planar processing) and of focal plane thermal control. Improvements in image control, i.e., jitter, drift and smear, are possible as well, provided the technology is pushed.

Star sensor accuracies should get down to the fractional arc-second range, with the potential of keeping within one-thousandth of the field of view.

An essential element of the technology base is knowledge of the background against which a particular object or "target" is to be sensed. Even so, one person's target is another person's clutter. So that background knowledge is doubly important, especially as detection and resolution capabilities increase.

In the radio-frequency regime, e.g., spaceborne radars and millimeter wave sensors (38), advances in three key areas can be expected:

(1) The burgeoning of large antenna technology since the projections of the 2020 Report is characterized today by the existence of at least thirteen structural concepts from industry, e.g., wrap-rib, radial rib, phased array, roll-out, electro-statically controlled membrane mirror, etc. Besides a single, large structure, a phased array of antennas--not just of the elements of a single antenna--can be envisioned for use in space, just as the concept is in use in NASA's Deep Space Network (DSN) on Earth. Such an array, for example, might logically consist of the use of long tethers such as Mayer and Bekey propose (23). Baselines on the order of tens of kilometers and more would be achievable with reasonable weights.

(2) Solid state technology, especially as it concerns radar transceiver modules, should see performance improvements by the year 2000 of a factor of ten in service output power and several decibels less in noise.

(3) The productivity of onboard processing will benefit as well from advances in solid state technology. By the year 2000 it should make sense to talk in terms of achieving billions of complex operations per second with only hundreds of watts and tens of pounds.

Sensing in the millimeter and submillimeter regime is essential to the astrophysical goals of, for example, NASA's proposed Large Deployable Reflector (LDR). NASA (5) has cited needs for research and technology (R&T) developments in submillimeter detection such as detector materials and arrays for the 1-200 micrometer range and, in the case of bolometers, for 200-1000 micrometers; alternative local oscillators and mixers for spectrometers; and improved arrays for heterodyne receivers. With reasonable support of associated R&T these advances should be achievable, certainly by 2030.

Recognition of the potential of lasers has greatly increased since the 2020 Report, both in terms of directed energy weapons and as solid state transmitters for communications links and as active remote sensors, with the bulk of developmental interest being shown by DOD and DOE. NASA development goals for tunable solid state lasers include long lifetime sources, alternate laser materials, high power, efficient laser transmitter, wave mixing techniques, and cavity design--all over a spectral range much wider than that presently of interest to DOD and DOE.

The role of advanced sensor developments and the advances in space science associable with them, in shaping space station concepts is elegantly set forth in Reference 40 by Herbert Friedman of the National Research Council.

F. COMMUNICATIONS

In 1980, the 2020 Report observed that the technological revolution of the previous 40 years is not expected to repeat in the period to 2020. Rather, an evolutionary type of growth is to be expected. This observation seems to have been a valid one over the ast five years.

As a result of work jointly and independently by NASA and DOD (12), developments are moving ahead with 20 GHz technology (i.e., low noise receivers, GaAs FET devices, monolithic power amplifier modules and IMPATT diodes) and 60 GHz IMPATT diodes. These plus the development of laser communication links between spacecraft should be well in hand by the mid-1990s. The impetus of the Strategic Defense Initiative (SDI) program and its need for secure, reliable and very-high-data-rate communications capabilities is a prime factor, of course. But its effect may well be to have gotten these advances sooner, rather than later.

Operational capabilities by 2000 will include multibeam antennas and high data rates, both enabled by improved onboard switching and processing, higher power at higher frequencies, and improved transmit/receive modules. The latter improvements will be shared by the sensor technology area in connection with future developments in space-based radar sensors. Corresponding improvements, i.e., miniaturization and mobility, in ground terminals can also be expected and, indeed, are already beginning to appear. See, for example, the hand-held satellite communications receiver on the cover of Aerospace America for June 1985.

The combined effect of these evolutionary trends toward increasing numbers of multiple beams and smaller user terminals should certainly be able to culminate in any of the personal communications concepts (i.e., wrist radio) described earlier.

Over the next half-century, the technology to support these communications systems will continue the trend toward higher levels of integration. Monolithic millimeter wave integrated circuits and submicron VLSI circuits will be mature technologies. Complete subsystems including both analog and digital functions will be combined on a single chip. Optical fibers will provide chip-to-chip interfaces. Onboard processors will benefit from supercomputer developments in new processor architectures and much higher clock speeds.

Deep space communications, that is over distances appreciably greater than, say, that of between Earth and the moon clearly would also benefit from the above mentioned advances. In particular, as mankind expands throughout the solar system, the ability to maintain high data rate communications will be of great importance. While increasing frequencies in the radio frequencies (e.g., going to K-band from X-band) and/or building larger receiving antennas offers some improvement in current capability, the use of laser-based optical communications appears still more promising. Operating with nondiffraction limited receivers of modest size in Earth orbit, such systems offer very high data rate capability with much reduced transmitter power and transmitter optics size relative to RF systems.

G. STRUCTURES

Many of the structural advances expected in the next two decades have already been highlighted either in the previous sections and in the 2020 Report, e.g., large antennas, pressure vessels. A pressure vessel development--particularly in terms of light weight, high transportability, radiation and thermal protection, and rapid erectability, is of obvious importance to establishing a viable manned habitat on the moon or Mars. Similarly, though on a different scale and set of requirements, for a space platform habitat. More limited still but of comparable importance, is the technologically similar need for safe, long-term storage of cryogen.

Structures and materials technologies tend to go hand in hand since structures can be viewed as ways in which to arrange materials. In addition, there is always a tradeoff between the combination of structures and materials on the one hand, and propulsion on the other, i.e., the less structural weight, the less propulsion required and so, the less cost involved. For space vehicles, composite structural concepts will prove cost effective for high energy vehicles (i.e., space tugs, planetary spacecraft), thermal expansion control (i.e., solar reflectors as well as antennas and telescopes), and minimum-guage stiffness-controlled designs (i.e., open graphite/sandwich truss work). At least a one-third reduction in weight over the current state of the art seems reasonable by the early decades of the next century.

Design criteria and optimization techniques should see significant advances, as well. Both can be regarded as being still in the formative stages and should be pursued, especially with respect to structural analysis. Significant effort is worth expending on the technology of controls/structures interaction (CSI). Not only would future CSI technology represent a significant change from present practices but that, without its development beyond the present state of the art, a number of NASA and DOD initiatives for the post-1990 time frame will face serious developmental constraints. Furthermore, progress here, as in some other newer technologies, seems to be moving with glacial celerity. At least 13 specialized computer programs presently exist or are under development; a basic need is to, in effect, blend their capabilities and develop comprehensive, interactive computer programs to accelerate greatly the process of structural analysis and design, including their deployment, assembly and joining in space as well as their testing and evaluation.

A better grasp than now is also needed in the areas of thermoelastic analysis of composites and of fracture mechanics, i.e., the small-scale internal structure of materials.

The use of inflatable space structures is also predictable. The example of the ESA concept for QUASAT was noted previously. Aeroballistic concepts under current study consider inflatable drag-producing (and heat-resisting) structures as feasible.

Warm/hot structural advances are in progress and need to be continued, with reference to applications such as a transatmospheric vehicle (TAV) aerobraking and aeroassist. The idea of a warm/hot structure is to offer more cost-effective means of countering reentry heating than presently afforded by the thermal protection system (TPS), dominated by tiles, on the current Shuttle Orbiter. In the far term, development of superalloy metal matrix composites as well as high temperature titanium would be of significant value up to 1800°F while comparable improvements in the understanding and application of carbon-carbon to hot aeroshell structures could extend to 3500°F. Two things should be kept in mind, however. One is that the construction of a TAV may involve the use of many different structural materials on the same vehicle, i.e., aluminum, refractories, superalloys, advanced composites, carbon-carbons. Secondly--and echoing remarks made at the outset of this section of technologies--a close relationship exists between not only structures and materials but also propulsion, aerothermodynamics, large structure control, and other technologies depending on the design application and approach.

H. MATERIALS

1. INTRODUCTION

The close connection of materials with structures technology has been amply emphasized. It will be convenient here to talk in terms of structural and nonstructural materials, as well as contamination controls.

2. STRUCTURAL MATERIALS

Structural materials of interest are organic- and metal-matrix and carbon-carbon composites, in addition to the metallic and ceramic hot structure material just mentioned. Organic-matrix structural composites include combinations of epoxies, polyimides, Kevlar, boron fibers and graphite fibers. With the use of higher modulus graphite fibers, the composite modulus by the year 2000 will increase by 50 percent. Metal-matrix composites, particularly Gr/Mg and Gr/Al, will increase in specific stiffness by a third, while providing a choice of positive, zero, or negative longitudinal coefficients of expansion.

Carbon-carbon (C-C) composites, because of their proved effectiveness in resisting high heating rates, make the retention of spacecraft structural integrity to 4000°F not unreasonable. The specific stiffness of two-dimensional (2-D) C-C composites should increase by about 50 percent by the year 2000 which, together with their inherent dimensional stability, justifies creating a design methodology for using this relatively brittle, low strain-to-failure material. C-C composites also show promise in making dimensionally stable mirror faceplate material.

Multiple mission capabilities for C-C composites means providing oxidation protection. Prospects appear good by 2000 for protection up to at least 3500°F. Large size applications of C-C composites as on a TAV, however, will require major differences in processing approaches.

Metallic alloys of interest for hot structures are of titanium, nickel and refractory metals such as columbium; by as soon as 2000, and coupled with progress in oxidation coatings and rapid solidification processing, their maximum use temperatures might rise as high as 1700°F, 2200°F, and 2500°F, respectively.

Monolithic ceramics for heat engines and even more so, ceramic/ceramic composites are still in their early stages of development and not yet available for use in spacecraft structures. A possible exception is that of fiber-reinforced glass composites where improvements in specific stiffness by the year 2000 could be as much as 100 percent.

3. NONSTRUCTURAL MATERIALS

These materials are those used, for example, in optics, electronics and space lubricants. For optics there exists a wide variety of material options for large mirror structures and faceplates; C-C composites were just mentioned. It seems reasonable to project no shortage of applicable technology into the next century, providing adequate R&T support is maintained.

Polymeric films are widely used on spacecraft. Degradation due to naturally occurring oxygen has been experienced, but indium-tin-oxide coatings, still in development, may become effective countermeasures. Improvements of a factor of 2.5 to 10 in film modulus by the year 2000 can be reasonably projected.

Electrical packaging materials, i.e., printed wireboard substrates, insulation materials, and coatings/encapsulants, could improve circuit board capacity per unit volume by a factor of 50 or more.

Cryogenic seals with lives as long as a decade could be ready for use by the year 2000. Lifetimes of space lubricants could be similarly long by then.

The lubrication of moving parts in space is a problem still under research in industry. Regular greases vaporize; dry bearings may seize. Loose bearings allow jitter in scan mirrors, for example, which degrades the image from a sensor. For both seals and lubricants, the benefits of developing long lifetimes can be measured in terms of the potential reduction of redundant components needed to ensure long-term reliability.

I. PROPULSION, POWER AND ENERGY

1. INTRODUCTION

Advances in propulsion, power and energy technology are of critical importance to the future of space exploration and exploitation, simply because they concern the feasibility of going into space and returning. As such, in terms of limiting man's future in space, they rank almost as high in criticality as those needed in human support and related areas as, for example, information processing, autonomy and automation. It is of vital importance, therefore, that the Civil Space Program have a clear view of the R&T developments needed as well as access to the necessary budgetary support in this as in other areas of the technology base. The entire field of space-related propulsion technology, both air- and non-airbreathing, is at this time undergoing a major overhaul due to the recently initiated DOD-NASA studies. As previously indicated, these studies are likely to last into 1988 and will certainly have a major impact on future programs and directions of development, along the lines described in the 2020 Report.

Similarly, with respect to recent developments in the fields of power and energy, especially as they relate to the SDI program. Again, as mentioned previously, such interest has activated an intense series of studies on air-breathing propulsion possibilities to launch an on-demand vehicle. Nevertheless, the comparative demands for such technology advances are just now being sorted out, and crucial demonstrations of feasibility are still in the offing to decide in detail which way to go thereafter.

In that light, the projections given in the 2020 Report--which laid special emphasis on this overall area of technology--appear to be adequate at the present time. The following discussion will highlight certain developments of possible significance.

2. CHEMICAL, ELECTRIC, AND ADVANCED PROPULSION

a. Chemical-Liquid (41)

Chemical propulsion will continue to be widely used for space transportation in the 2000 to 2030 time period.

To reduce the cost of transportation between low earth orbit (LEO) and geosynchronous earth orbit (GEO), a reusable space station-based Orbit Transfer Vehicle (OTV) will be in use before the turn of the century. Such an OTV will probably make use of a high performance cryogenic (liquid oxygen/liquid hydrogen) main engine and will be aerobraked to reduce propellant mass consumption.

If such an orbit transfer vehicle is developed, an on-orbit propellant depot will be required that can store cryogenic propellants in useful form for at least 90 to 120 days. Continued development of cryogenic propellant handling and transfer methods will be an important precursor to implementation of this technology.

Engine specific impulse performance in the range of 475 to 500 s may be achievable in the time frame of interest. Such high performance will be needed for a wide variety of applications beyond the OTV mission. Before they can be used on operational missions, however, these engines and systems must be thoroughly tested on the ground and in space.

Since the propulsive energy requirements for transportation to and from the Moon or Mars are nearly the same as for LEO to GEO transportation, much of the engineering and technology development required for the OTV will be directly applicable to manned Lunar base development or to manned Mars exploration. A unique technological feature of future manned planetary exploration would be in situ production of chemical propellants. If feasible, this could result in significant reductions in the mass required to be launched to LEO in support of missions to the Moon and Mars.

Processes for extraterrestrial propellant production will be significantly different from their terrestrial counterparts due to the lack of readily available working fluids (such as water, which is intensively used in terrestrial chemical processes); low gravity; and stringent requirements for autonomous operation. Studies to identify requirements and options will be needed before an optimal processing system can be defined for various missions.

b. Chemical-Solid (42)

Liquid propulsion has dominated those missions requiring the high performance achievable only with cryogenic fuel, or those missions requiring the versatility of multiple restart and throttling operations. Most missions do not require these sophistications in propulsion, however. Solid rocket propulsion then becomes the choice because of its simplicity, higher reliability and resulting lower acquisition and operating costs.

By the year 2030, the trends for solid motor vacuum delivered specific impulse with aluminum or beryllium fuel, point to values of 320 s and 340 s, respectively, using large expansion ratio (240) nozzles. Beryllium technology could provide performance levels competitive with storable liquid systems for transfer and maneuvering vehicles.

Long term space storability (5 to 10 years) is an important consideration for future space missions. One-year vacuum aging of nonplasticized solid propellants has shown no significant degradation of ballistic or mechanical properties. Vacuum storage, simulated space storage, and actual space storage (using the Long Duration Exposure Facility) of solid propellants is being conducted. Further tests are needed.

All solid booster vehicles capable of placing heavier payloads (150,000 to 300,000 lbm) into low earth orbit could benefit from the development of what would be the largest land transportable solid booster (156-in. diameter compared to the 146-in. diameter used on the Space Shuttle). For launch vehicles capable of placing more than 300,000 lbm into low earth orbit, an all new recoverable solid rocket motor greater than 200 in. in diameter would most likely be most cost effective. This heavy lift launch vehicle (HLLV) would not be land transportable and would have to be manufactured near the launch site. Consideration should be given to the development of an all-solid heavy lift booster. Its development would also drastically reduce the cost of a new launch site, launch operations and logistics support.

c. Electric

A number of different electric propulsion thruster concepts have been evaluated and developed to various levels of maturity. These concepts fall into one of three generic categories, dependent on the physical phenomena used to accelerate the propellant: electrostatic, electromagnetic, or electrothermal acceleration.

A 30-cm mercury ion engine has been developed for primary propulsion of interplanetary spacecraft. Table 1 shows the performance characteristics of this engine operating at the existing maximum design point as well as at upgraded near-term (1988) and expected far-term (1993) performance levels. The use of existing ion propulsion systems on today's missions is vital to gaining the experience necessary to allow for well informed application of more advanced electric propulsion systems in the coming decades. Future improvements in ion thruster performance will be obtained through increases in beam current and voltage.

Within the next few years magneto-plasma dynamic (MPD) thrusters will be ready for system development. Their potential advantages relative to ion thrusters are simplicity of power processing and the higher thrust density. Further, they may be well suited to steady state operation at megawatt power levels.

Arcjet thrusters were constructed and operated successfully at high efficiency and with long life in the early 1960s. A new initiative has been made to verify the performance values quoted in these early experiments and to extend this research. Table 2 gives the demonstrated performance of arcjet thrusters operating with various propellants.

Each electric propulsion concept would have a role in the future of space transportation. Ion propulsion is best suited to high energy missions of planetary exploration due to its high specific impulse performance. MPD thrusters will be applied to advanced missions in which large amounts of power are processed for propulsion (1-10 MWe). Arcjets are best suited to the orbit raising missions for modest payloads in which moderate (5-50 kWe) power levels are available. Electric propulsion systems are expected to use solar or nuclear energy sources.

d. Advanced (41)

Both chemical propulsion and electric propulsion will have an important place in the 2000-2030 time frame. However, if new missions, such as manned exploration of the outer solar system or unmanned probes well

Table 1. Mercury Ion Engine Performance Projection

Parameter	Today	Near Term (1988)	Far Term (1993)
Beam Current (amperes)	2.0	2.8	7.0
Specific Impulse (sec)	3000	3570	4250
Thrust (Newtons)	0.13	0.27	0.63
Efficiency (%)	72.3	78.4	79.8
Input Power (kilowatts)	2.65	6.38	16.75

Table 2. Historic Arcjet Thruster Performance

Propellant	Specific Impulse (sec)	Efficiency (%)	Thrust Level (Newtons)
Hydrogen	855	74.0	4.53
Hydrogen	1010	54.0	3.31
Hydrogen	1520	44.0	1.77
Ammonia	978	38.0	2.40
Ammonia	1012	38.6	2.38

beyond the solar system are to be considered, fundamentally more advanced propulsion systems will be required. Even if these systems are not in common use by 2030, it is necessary now to make preparations for the development work that will be taking place. Performance and economic analyses should be conducted interactively with research to clearly define the potential characteristics of advanced propulsion concepts. Such analyses should not necessarily be constrained to specific missions, but rather used to orient work broadly toward the achievement of desirable component and system parameters.

Table 3 shows the maximum theoretical energy density and corresponding exhaust velocity performance of various propulsive energy storage concepts. As can be seen, conventional chemical propellantc (such as oxygen/hydrogen or fluorine/hydrogen) are limited to exhaust velocities of approximately 5 to 6 km/s. High energy chemical propulsion concepts involving the use of meta or quasi-stable substances may yield exhaust velocities of up to 20 to 30 km/s within the performance range covered by existing electric propulsion concepts. The basic feasibility of these high energy chemical concepts is in serious doubt. However, even if feasible, stability problems relating to propellant generation, storage, and utilization may render them impractical.

Table 3. Theoretical Performance of Propulsive Energy Storage Concepts

Type	Energy Release (Joules/kg)	Exhaust Velocity (km/s)
Chemical (O_2/H_2)	1.5×10^7	5.5
High Energy Chemical	2.2 to 4.5×10^8	20 to 30
Nuclear Fission	8.2×10^{13}	1.3×10^4
Nuclear Fusion	3.9×10^{14}	2.8×10^4
Antimatter Annihilation	9.0×10^{16}	Speed of light

In terms of stored energy density, the next step beyond high energy chemical propulsion is a six order of magnitude jump to nuclear energy. Nuclear fission, nuclear fusion, and matter-antimatter annihilation are the known exothermic nuclear reactions that may eventually be harnessed for propulsion applications. Another means of obtaining propulsion system performance that is significantly beyond the performance of chemical propulsion is to utilize remote energy sources such as the sun, a high energy laser, or a microwave transmitter. In general, highly advanced spacecraft propulsion concepts can be characterized as using either nuclear or remotely located energy sources.

The first use of nuclear energy for space propulsion will probably be in nuclear electric propulsion (NEP). Unfortunately, electric power system mass, reactor fuel burn-up constraints, and overall system efficiency limitations prevent NEP from utilizing a significant fraction of the theoretical energy density available in nuclear power.

A wide variety of nuclear fission propulsion concepts exist. Nuclear thermal rockets have the advantage of moderately high specific impulse and high thrust, but are limited due to material constraints to effective system energy densities not much greater than can be achieved with chemical propulsion. Dual mode nuclear reactors with both high thrust and low thrust capabilities may evolve in the 2000-2030 time frame. Power sources may be solid core or, later, plasma core reactors. Nuclear fission pulse propulsion represents the next step up in terms of propulsion systems performance with exhaust velocity limits of 40 to 100 km/s. There appear to be no insurmountable technical barriers to the application of nuclear pulse propulsion; rather, the most significant barrier to its application seems to be political in nature.

Fusion energy represents another option for advanced space propulsion. Propulsion concepts based on inertial confinement fusion (ICF), magnetic confinement fusion (MCF), and unconventional aneutronic concepts have been proposed. Research directed at the harnessing of useful energy from fusion is an active research topic at numerous national laboratories. If controlled energy break-even occurs during this century, fusion powered space propulsion systems may be ready for use by 2030 (if not well before then), effectively opening the entire solar system to human exploration and utilization.

Antimatter is the ultimate energy storage concept because complete annihilation can occur upon contact with normal matter. Antiproton physics is receiving increased attention. Antiprotons are now being produced, collected, cooled and stored at a number of particle physics laboratories around the world. The quantities being produced, however, are exceedingly small (micrograms per year) and production energy efficiency is only a few parts in a billion. Estimates have been made that production efficiencies can be enhanced significantly and that antimatter production costs of $1 to $10 million/mg may be achievable.

The concept behind remote energy sources for advanced propulsion systems is to remove the power supply from the spacecraft, thereby freeing the spacecraft from the limitations of onboard energy sources. If advanced nuclear energy concepts cannot be made practical, the use of remotely located energy sources may be the only way to effectively obtain ultra-high performance propulsion systems.

Conceptually, the simplest space propulsion system based on a remote energy source is the light sail. In a light sail, thrust is produced through the harnessing of photon pressure by reflection of electromagnetic radiation. Studies have shown that it may be feasible to construct solar powered light sails which compete favorably with other low thrust propulsion systems for the completion of unmanned missions of planetary exploration. Another interesting future application of solar sails may be as cargo ships delivering supplies to human colonies located throughout the inner solar system. Laser and microwave powered sails have also been proposed but would require extremely high beam power levels to produce useful levels of thrust.

Advanced electric propulsion systems may eventually be powered remotely through the use of beamed laser or microwave energy. Studies show that laser or microwave receivers can operate at much higher efficiencies, and with lower mass, than solar energy conversion devices. Microwave power transmission and reception technology is available, though engineering development is required before these systems can be widely applied to propulsion. NASA-sponsored solar pumped laser work and high-power, space-based laser technology under development for defense applications may lead to the technology required for laser propulsion.

3. TETHER APPLICATIONS

Tether applications, as a relatively clean, simple and cost-effective approach exploiting the space environment, offer substantial potential in propulsion, power and energy applications as they also do in other areas (23). They pose the possibility of direct momentum transfer such as to increase the payload of the Shuttle or an OTV. Use of a conducting tether in the Earth's magnetic field would lead to electrodynamic applications such as power production, drag makeup, battery replacement, and OTV thrust or braking. The critical technologies in this version of propulsion, power and energy technology lie in the area of tether materials and control techniques.

4. SPACE POWER (5, 43a, 43b)

Figure 24 from Reference 43b depicts currently expected demands on space power and duration through the year 2010, together with the regimes of various power sources. The present state of the art provides capabilities that support missions requiring power levels up to a few kilowatts with solar photovoltaic systems or radioisotope thermoelectric generators (RTGs), and short-term multikilowatt-level missions using chemical systems such as fuel cells and batteries.

Solar arrays should improve substantially in efficiency and lifetime over the next few decades. As Reference 5 points out, silicon and advanced silicon solar cells will likely be replaced by advances stemming from research on gallium arsenide (GaAs) as multiple bandgap cells. Better manufacturing methods, e.g., array interconnect welding, replacing soldered interconnects, will increase life and decrease production costs. Self-annealing GaAs cells will increase array lifetime, as will the use of concentrators to protect cells from unwanted radiation and particulate contamination. By the year 2000, NASA projects the probable attainment of a specific power of 150 W/kg and a design life of 25 years up from about 50 and 15, respectively, today.

In the coming decades, RTGs will continue to be a safe source of long-term, i.e., 7 to 10 years, power up to the miltikilowatt level, i.e., 4 to 5 kW. Specific power levels for RTGs are now on the order of 4 to 5 W/kg, with capabilities projected on the order of 8 to 11 W/kg. This goal will require the successful development of advanced sulfide materials along with improvements in low density thermal insulation and in high strength, low weight structures.

Developments in the joint NASA/DOE/DARPA SP-100 Space Nuclear Power Program will by definition be of long term interest to future Civil Space Programs in terms of long-life, high-power, i.e., megawatt, applications such as nuclear elecric propulsion (NEP) orbital power stations, as discussed before.

Chemical systems, i.e., fuel cells and batteries, are candidates for primary (non-rechargeable) and secondary (rechargeable) energy sources. Primary fuel cell technology will be advanced from the present Orbiter fuel cell to the lightweight Orbital Transfer Vehicle (OTV) stack, and ultimately to advanced concepts including molten carbonate and high temperature solid oxide systems. Important to the presence of man in space will be the further development of H_2O_2 regenerative fuel cell systems; advances into H/X regenerative fuel cell systems and higher temperature operations will also increase energy densities and provide an alternative to batteries. Advances sought by the mid-1990s in fuel cell technology will be system lifetimes approaching five years and power levels of about 100 kW. NASA is evaluating primary batteries using lithium based on SO_2, SO_2Cl_2, and $SOCl_2$; these promise of doubling current energy densities by the mid-1990s to about 300 W-hr/kg and extending the net stored lifetime by a factor of five, i.e., to about ten years. Secondary batteries are in transition from NiCd to NiH and ultimately to high energy density rechargeable batteries (HEDRB), which promise densities and lifetimes on the order of 110 W-hr/kg and five years, respectively.

As Reference 5 points out, concurrent with increasing power levels must come advances in power processing and distribution. Major areas of concern include the type, size and weight of the distribution system, the interaction of high voltage systems with the space environment, and the management and dissipation of heat and radiation.

In the area of advanced power system technology, several initiatives now under early development merit mention. Techniques are in study to connect solar energy to energy beams for transmission to user spacecraft. The use of flywheels for energy storage is also under study, due to their potential for very long life and reduced mass energy storage. Experimental research is under way on an advanced thermal rejection concept, the liquid droplet radiator, which promises large reductions in radiator mass and area.

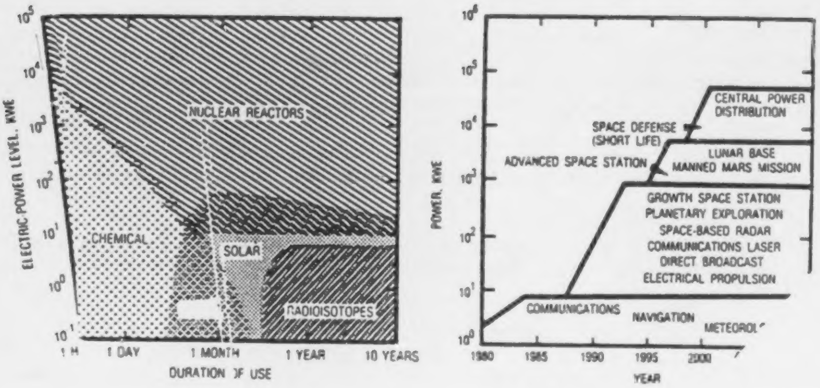


Figure 24. Space Power Regimes and Future Demands

J. ATMOSPHERIC FLIGHT

Under the heading of aerothermodynamics, the 2020 Report discusses the field with respect to reentry, aerobraking and aeromaneuvering. Ballistic reentry and aeromaneuvering technologies are well understood as a result of DOD work over the last 25 years or more, not to mention NASA's work on the Shuttle.

Concepts of aerobraking, however, have only recently received a major stimulus under the aegis of NASA (34). While problems of guidance and thermal control have been identified, none appear fundamentally intractable. So that it is relatively straightforward to project that, in the relatively near future, aerobraking will be incorporated as a standard feature of future spacecraft whose missions entail atmospheric encounters at relatively high velocities. The advantages seem clear cut in terms of increased payload and decreased weight.

As noted before, atmospheric flight at Mars represents special demands because of the annual 20 to 25 percent variation in atmospheric density. Consequently, attention to both aerodynamic design and rapid sensing and attitude control will be especially important, especially if only one design is to be used.

K. THERMAL MANAGEMENT

The range and interaction of thermal phenomena acting on space systems has become considerably wider and more complex with time. Relatively simple steps of thermal control have now had to be integrated under the rubric of thermal management. Automated thermal design and analysis techniques are now having to be developed, consistent with the continuing overall need being met by advances in computer-aided design/engineering (CAD/CAE). Here, as in other areas, the relative importance of new developments in any one of the component technologies remains to be seen, as comparative design analyses weight one approach against another.

A number of applications involving multimegawatt heat rejection will require very large radiators and a need for much lighter weight space radiator technology. Innovative approaches such as the liquid droplet radiator, the moving belt radiator, and/or lightweight heat pipe radiator concepts will have to be developed.

The significance of thermal control coating degradation is now beginning to be appreciated. The space environment causes some degradation; the rest of it comes from contamination. The former can be predicted through test sampling. The latter, by contrast, is difficult to predict and prevent partly due to lack of data, e.g., on materials outgassing, on natural particulates infall rates on orbit, attitude control emittants. Low funding for research is also a major factor. Contamination and consequent degradation of sensors must also be regarded as a threat that must be countered; it can effectively nullify optical system performance.

For high power systems, thermal management techniques can be expected to improve, e.g., radiator effectiveness, heat flux handleable by passive protection and active control

Cryogenic cooling of sensors must be both effective and long lived. Refrigerator capacities could increase by ten and lifetimes doubled by the year 2010.

Advanced thermal protection systems are being explored not only to serve Shuttle follow-ons but also advanced aerospacecraft such as the Transatmospheric Vehicle (TAV) and aeroassisted orbital transfer vehicles (AOTV). Carbon-carbon composite materials are one component, as mentioned above in the section on materials. NASA and DOD are exploring various approaches, as illustrated in Figure 25. These presently include flexible ceramic blankets, metallic panels, and advanced hot structure using active cooling.

L. ENVIRONMENT

1. INTRODUCTION

Increased attention paid in recent years to the environment of space has resulted in an increased appreciation of the number of factors and problems that must be solved, particularly if long-term human presence in space is to become a practical and productive reality. The environment spoken of here, however, is not only that of the planets and open space, but also that of Earth's environment, i.e., its ionosphere and atmosphere.

2. EARTH'S ENVIRONMENT

High accuracy for aerobraking and aeromaneuvering is not possible with current atmospheric density models; more meteorological data are needed. As a start, NASA use of tethered drogues (23.b) from the Shuttle is scheduled to measure high altitude properties over the next few years. (A similar application to other planetary atmospheres such as that of Mars, would also made sense.)

Background measurements and reliable predictions including, for example, cloud histories and rainfall, are needed for purposes of missions requiring relatively high resolution observations of Earth and/or relatively high transmission rates to Earth, say, by extremely high frequencies (EHF).

Also needed are measurements of the auroral regions to better understand and predict ionospheric propagation effects. In this connection, the Earth's global electrical circuit is also poorly understood (44). Its regime extends into the magnetosphere, as Figure 26 describes. This lack of present knowledge would, therefore, impinge on space-related concepts such as communications systems, electrodynamic applications of tethers, and high power/energy transfer concepts. Basic research is under way at Arecibo and Tromso to understand the ionospheric disturbance potential of relatively large amounts of directed high frequency (HF) energy. What is needed is a comprehensive set of data incorporated into a dynamic model that can always be improved.

3. SPACE ENVIRONMENT

The effects of the micro-gravity environment on orbit are of increasing interest and concern, but sill poorly understood in terms of their practical day-to-day implications, both for good and for bad. For good, the prospects for beneficial and even profitable processing of materials in space

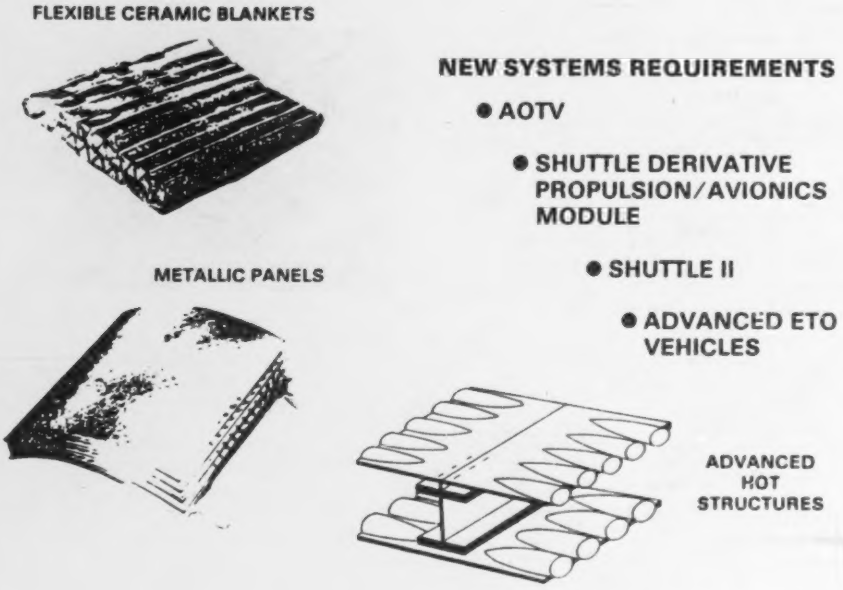

FLEXIBLE CERAMIC BLANKETS
NEW SYSTEMS REQUIREMENTS
● AOTV
● SHUTTLE DERIVATIVE PROPULSION/AVIONICS MODULE
● SHUTTLE II
● ADVANCED ETO VEHICLES
METALLIC PANELS
ADVANCED HOT STRUCTURES

Figure 25. Thermal Protection Systems

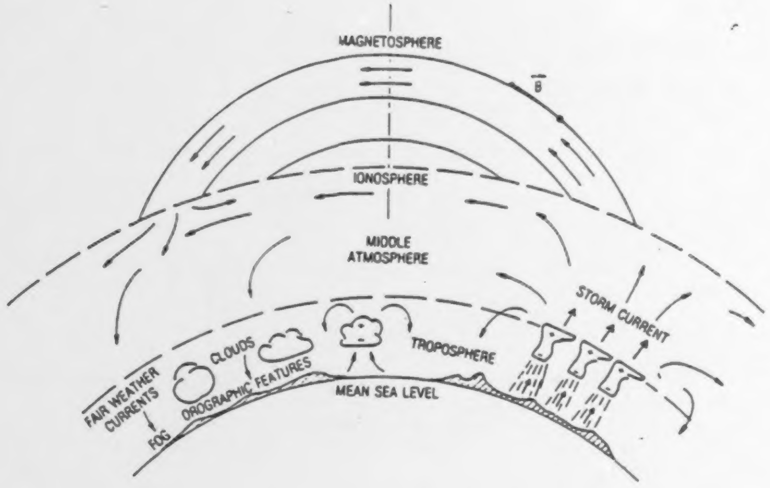

MAGNETOSPHERE
$\overline{B}$
IONOSPHERE
MIDDLE ATMOSPHERE
STORM CURRENT
TROPOSPHERE
CLOUDS
FAIR WEATHER CURRENTS
OROGRAPHIC FEATURES
MEAN SEA LEVEL
FOG

Figure 26. Earth's Global Electrical Circuit

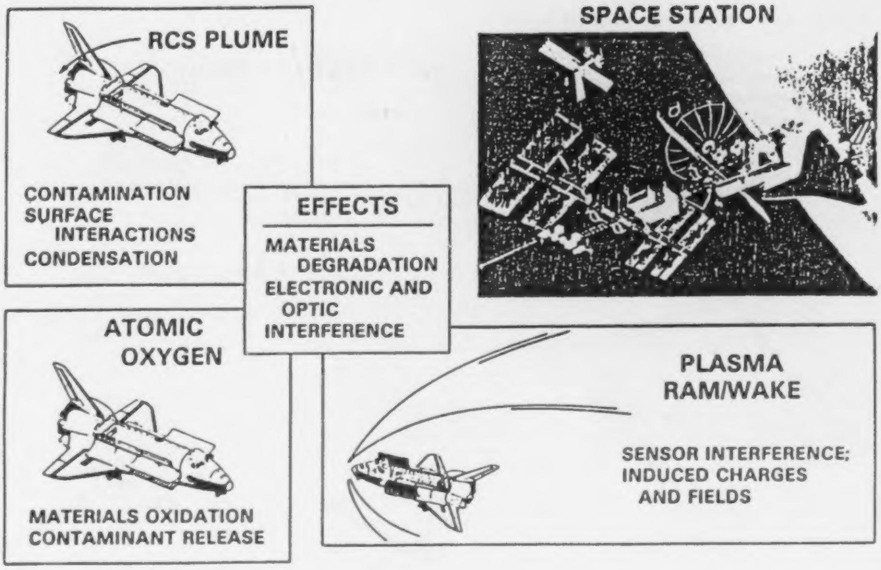

RCS PLUME
CONTAMINATION
SURFACE INTERACTIONS
CONDENSATION
EFFECTS
MATERIALS DEGRADATION
ELECTRONIC AND OPTIC INTERFERENCE
SPACE STATION
ATOMIC OXYGEN
MATERIALS OXIDATION
CONTAMINANT RELEASE
PLASMA RAM/WAKE
SENSOR INTERFERENCE;
INDUCED CHARGES AND FIELDS

Figure 27. In-Space Contamination/Environmental Effects Experiments

appear to be brightening, as noted earlier. Solely from the standpoint of producing high potency pharmaceuticals, such prospects should be intensely pursued. For bad, as will be discussed later, the implications of the micro-gravity environment for human health in space could clearly be grave.

Further capabilities to predict and mitigate trapped radiation, solar particle events (SPE), and cosmic rays can be judged good to excellent, with lead times for SPE predictions possibly reaching a day by 2010--which should be adequate to take shelter. Spacecraft charging should not be a problem to handle, even considering differential charging between an astronaut on EVA (extravehicular activity) and spacecraft to be serviced.

Plasma interactions on large structures in Earth orbit are yet to be understood; Shuttle-based testing is only just beginning. Particle beam technology may have possible uses including control of charging and modification of hazardous environments.

As with the Earth's environment, data and modeling are the ingredients needed.

4. MAN-MADE AND OTHER ENVIRONMENTS

Included here briefly are contamination, orbital debris, nuclear radiation and meteoroids. Contamination, its sources and implications, has already been discussed. Here the stress is on the critical need to get an overall and focused grasp of the subject. NASA is proceeding in that direction as summarized in Figure 27.

Man-made orbital debris has also been previously cited as an increasingly serious threat of international concern. In the latter regard, an excellent current summary of the situation, especially as it would impact on an expanding manned presence in space, is given in Reference 45. The mounting hazard points to possibly serious problems for large space platforms, particularly in near-earth orbit, and the need to control the presence and buildup of debris at low orbits (Ref. 46 and Figure 28). The growing potential for disaster at geosynchronous orbit should not be ignored, either. The international nature of the problem, both as to cause and to consequence, points in turn to the appropriateness of an active international solution.

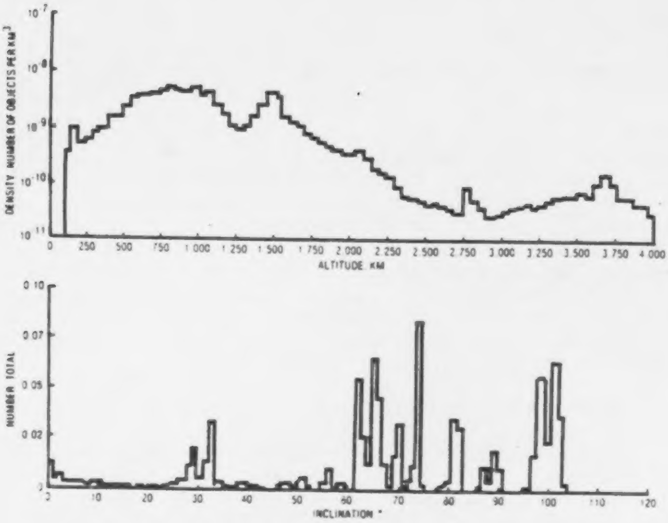


Figure 28. Space Hazard Zones

Exoatmospheric nuclear detonations are also an environmental hazard to be considered for nonmilitary space systems in the next few decades. While the prospects today might seem vanishingly small for such an event over the next 30 to 50 years, so did they 35 to 50 years ago for many of the events that are taking place today. Nuclear proliferation is still taking place; so too the international spread of space launch capabilities, along with that of terrorism. The long-term possibility of another exoatmospheric burst, with its dangerous consequences to the immensely high value assets in space that will have accumulated by then, should not be underestimated. One logical preventative measure would be, early on, to ensure that all nations have a stake of respectable self-interest in space.

M. HUMAN SUPPORT

1. INTRODUCTION

Given national intent to establish a permanent manned presence on orbit, there can be no more critical technology than that of human support. It comprehends not only the life sciences, viewing humans as objects, but also the societal aspects, viewing humans as sentient and social beings.

2. PHYSIOLOGICAL

Based on experience to date in orbit, it is evident that, as on Earth, so in space, we still have much to learn about physiological aspects of preserving human health. Rambeaut of NASA points out (47) that the reversibility of osteoporosis is unclear, that soft tissue calcification could in theory cause problems, that long-term cardiovascular deconditioning may lead to blackout on reentry, and that space adaptation syndrome is unconquered and may limit EVA. A flight to Mars without proper shielding and protective procedures would involve so much of a radiation dose that the astronaut would be disqualified from making the return trip.

In the relatively more benign environment of LEO, the Shuttle extravehicular mobility unit (EMU), or space suit, has served well its trail-blazing purpose (48). The next step, now in progress by NASA, is the space station EMU. One of its major features is an 8-psi environment that will eliminate the hazards of decompression sickness. Characteristics of such an advanced EMU are also of interest to DOD, including a new, noncontaminating primary life support system (PLSS), micrometeroid and debris protection, a heads-up display, minimum static charging hazard, and immediate EVA capability, to name a few. Such a unit could be operational by the 1990s and be useful for decades.

Not to be ignored are the prospects of a medical emergency that may even require rapid return of an astronaut to Earth from a LEO or GEO space station. Accordingly, NASA has formulated a space medical system concept that includes, besides in-situ treatment, an OTV/ambulance to a space station with a trauma/burn center, plus a Shuttle rescue vehicle to Earth, if necessary. Closely related is a space rescue capability to use with "uncooperative" or disabled, manned vehicles (such as that foreseen by the media about 25 years ago in the film entitled Marooned). Aside from their constructive benefits, therefore, manned OTVs and highly automated, remotely controllable OMVs (or teleoperators) as being pursued by NASA have their remedial benefits also, and certainly merit strong support.

3. PSYCHOLOGICAL AND SOCIETAL

As has already been noted, the drive to cut costs of future space operations translates in part to increased autonomy and automation on orbit, including robotics and so-called artificial intelligence techniques. Even for highly automated functions, it is impossible realistically to conceive of any situation not requiring human intervention at some level or stage. Humans have not yet been able to build a machine that demonstrates a recognizable or non-trivial ability to reason, recognize or induce, especially in the presence of the unexpected. For the foreseeable future a principal aim of the space program is to enable us to discover the unexpected, cope with it, and revise our expectations accordingly. Machines will increasingly assist humans to the extent that humans will be able to define their expectations and improve the machines accordingly. Conversely, to the extent that surprises are in store and learning is to be done, human cognizance is by definition essential.

The technology of man/machine interface design must be developed. To that end, the hardware and software for powerful information display, storage, and processing systems is available, related research is under way on how best to integrate a wide range of information and reminder cues into an effective decision-aiding display. A key step would be to keep its overall size, weight and power requirements within orbitally feasible bounds.

In another area, it is well recognized that a long-term human presence in space must accommodate the natural need of humans for such things as privacy, diversion and communications with home. As is well known from naval operations and from experiences in Antarctica, for example, the societal structure of a space-based habitat must be given explicit and careful attention. Neglect of such considerations, especially by the time that a routine stage of operations has been achieved, could cripple the entire endeavor, perhaps fatally.

N. MANUFACTURING

1. INTRODUCTION

The feasibility and quality, as well as the cost effectiveness, of manufacturing technology has become of increasing concern to both NASA and DOD. There is nothing unique about space-oriented programs that makes them immune to such concerns, and a sound approach to a Civil Space Program of the future will account for them. References 49 and 50 point to several of the problem's dimensions now being recognized, i.e., production and testing, as well as basic "people problems" arising with the introduction of computer-aided design/engineering/manufacturing (CAD/CAE/CAM) techniques.

A parallel consideration is that space-related activities have matured to the point whereby the Civil Space Program should establish a set of common specifications and standards applicable throughout government and industry and appropriate, as well, to its international partners. Nationally, past programs (e.g, Apollo, Space Shuttle) have suffered from cost and schedule impacts due to inconsistencies of specifications and standards from different NASA centers, imposed on the same contractors. Internationally, common specifications and standards are needed to assure interfaces that work as they should, e.g., as in payload integration, rendezvous and docking, etc. International specifications and standards are also needed to assure adequate safety of personnel in space as well as on the ground.

Some work within NASA is already under way toward the establishment of space-related specifications and standards both nationally and internationally. Also, the AIAA is itself devoting increasing attention to this rising need. It merits serious and continuing effort by the Civil Space Program in the decades ahead.

2. ON EARTH

As References 49 and 50 point out, improvements in space-related manufacturing techniques, including quality control, are desirable. Areas of concern to both NASA and DoD include precision manufacturing, electronics, optics, composite materials, power distribution, assembly and verification. The appropriate use of flexible automation, incorporating robotics as well as CAD/CAE/CAM techniques, is also of concern. Each area merits specific attention in that evolutionary advances in current manufacturing capabilities are unlikely to be adequate. CAD/CAE/CAM (computer-aided design/engineering/manufacturing) techniques, in whatever form, must be considered as enabling technology for future space systems. Full exploitation of this technology cannot be accomplished, however, without the implementation of data exchange standards. To this end, the Initial Graphics Exchange Specification (IGES), promulgated by the National Bureau of Standards, makes it possible for product definition data (e.g., geometry, properties, drafting information) to be transferred between different vendor computer systems. In the specialized area of very large scale integrated (VLSI) circuit development, two standards are evolving. On the government side there is the VHSIC Hardware Descriptive Language (VHDL). Meanwhile, leading vendors of VLSI design workstations are implementing the electronic design interface format (EDIF). Both are critically important.

3. IN SPACE

As has been mentioned, the technology of materials processing on orbit is still to be developed to the stage of commercial viability. Although the specific products that will be economically viable cannot at present be identified, they are likely to include at least:

a. Biological materials including the possibility of new and improved life-giving pharmaceuticals

b. Electronic materials including compound semiconductors and electro-optic materials for extremely large, fast computer chips and advanced sensors

c. Metals and alloys including new magnetic materials and foam metals

d. Glasses and ceramics with very high purity and low defect counts.

While this industry may grow to have a significant impact on society, other space processing activities will continue to develop. These include fundamental scientific investigations, applied research aimed at improved ground-based industrial processing, the processing of terrestrial materials for use in space, and the use of extraterrestrial resources (e.g., lunar, asteroidal, Martian) for earth-orbit and cislunar systems fabrication. The spectrum of materials, processes, objectives and participants - both domestic and international - in these space processing activities will lead to a wide range of requirements for g-level (10^{-3} - 10^{9}) duration (hours-months), in-process observation and adjustment, power levels, hazard protection, cost, and proprietary protection of results.

Each of the activities will generally have an initial in-space process development phase. A clearly emerging trend in present activities is to involve man-in-the-loop to observe, interpret, and adjust processes in situ. This trend appears to have a significant impact on program efficiency (e.g., number of flights required for process development) relative to the previous baseline approach of autonomous preprogrammed experiments. This in turn leads to a substantial in-orbit manned laboratory requirement for the space station. Other space station/space infrastructure/space processing related systems will include the need for attached and free-flying research and production platforms, rapid sample return systems to reduce crew time requirements (1/week-1/month) and possibly variable gravity systems using tethers. The rate of development of space processing in the 1990s will likely be driven by space station crew time and power capabilities. Program cost will continue to be driven by the cost of transportation, not in-orbit operations. Beyond the initial space station, large manned research labs, fleets of free-flying factories in low earth orbit, as well as ferries and transports will be required.

Artificial intelligence (AI) systems will be necessary for pilot and full production systems. Experts will be required to train such AI systems. These experts will likely need in-space experience. First, students must be trained on earth, in both engineering and science, to understand the impact of space flight on processes and processing systems. Consideration should therefore be given to the development of new educational programs to support these activities. Excellent protoyypes include the Utah State University student Getaway Special Program and the NASA Shuttle Student Involvement Program.

The idea of manufacturing (and mining) on the Moon and Mars is now only in the most preliminary state of practical realization. Concepts and gross estimates of the basic feasibility and economic potential have been regularly set forth and discussed, e.g., the seventh biennial SSI/AIAA/Princeton Conference of Space Manufacturing in May, 1985. At the moment, however, precious little in the way of solid data, such as any mineralogical samples from Mars and relatively few from the Moon, is available. Before we can go much further in speculating on the manufacturing potential of space flight, therefore, it is essential that we gather much harder evidence, both figuratively and literally, than we have now. NASA's space station should vastly improve our awareness and insights as to what can be done in the micro-gravity environment of near-earth orbits. But it will take a deliberate, step-by-step program of prospecting, collecting and analysis of samples from the Moon and Mars before their potential for manufacturing productivity can be responsibly assessed.

O. TEST AND EVALUATION

Like that of manufacturing, the collective technology of test and evaluation (T&E) has emerged as one of increasing scope and importance to future space system development and operations. The idea of T&E, of course, is to simulate the experiences to which the system, in part and in whole, will be subjected. The techniques include inspection, modeling, simulation and analysis, physical exposure to stimuli, performance and response measurements, and so forth. T&E involves both the developmental and operational phases of a program. By and large, the T&E needed for space system concepts of the future will be a formidable task and require major advances in test methods and associated technologies. For example, as depicted in Figure 29, NASA contemplates a large spacecraft laboratory capable of ground-testing a half-scale model of the space station. Even so, a one-g environment is obviously unsuitable for T&E of a large flimsy space structure, designed to take advantage of the micro-gravity environment of space. Such a structure would clearly have to have its T&E done on orbit.

Similarly, even the T&E of micro-gravity manufacturing process would require a platform separate from the space station to assure that movements of various masses on the station do not compromise the results.

New ground and space T&E technologies and techniques will have to be developed for use in each of the "basic" technology areas. For example, propulsion T&E will be driven by advances in areas such as high chamber pressures, nozzle designs, electric thrusters, extended life and concerns about contamination control, propellant storage, etc. Likewise, thermal control T&E will be driven by needs for large radiators, high performance heat transport systems, and long life cryogen cooling and storage, and, above all, by the need for full-scale T&E of a total thermal management system of increasing complexity.

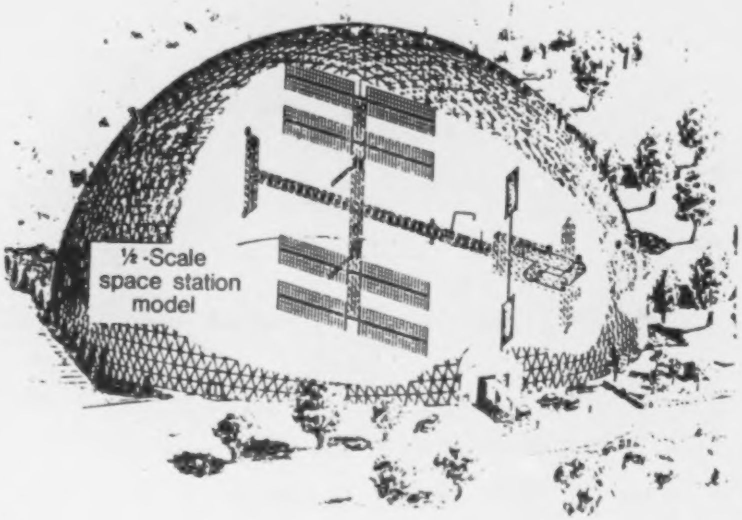


Figure 29. Large Spacecraft Laboratory

Tether applications in space represent a class of possible improvements in space-based T&E. Most radically of all, the space station itself can be viewed as a T&E facility whose very concept embodies the kind of advances in T&E just cited.

P. ECONOMICS

The technology of space system economic analysis has been improving to the point of recognized validity in recent years. It embraces not only cost estimation but also assessment of the relation between schedules and costs, especially with respect to schedule slips, under-funding, etc.

As with CAD/CAE and mission planning at JPL (39), advanced computer techniques have come into being whereby designers and program managers can evaluate the cost sensitivities of alternative concepts and approaches in a matter of minutes, rather than the weeks previously required. Additionally, the data bases required have been improved significantly with respect to breadth and depth as well as content.

These advances have yielded at least one very useful side effect. By increasing productivity, individual talents have been freed to explore and assess the impacts of proposed new technological advances. For one example, the changes in manufacturing and the technologies associated with, say, large structures in space are reflected in changes in the estimating techniques as well as the estimated costs involved. The latter changes can now be anticipated much further in advance than heretofore. As a result, the potential for a useful feedback to the development of those technologies now exist, such as to influence that development among more cost-effective paths than otherwise.

Similarly, as the technology of human support progresses and more is learned about the needs and component costs of humans on long-term tours in space, it will be possible to select on a more informed basis than otherwise the most cost-effective approach to establishing a base on Mars, for example, from among the many alternatives that even now can be identified. Thus, in the long run, the most cost-effective approach may prove to be not the one involving the least propulsion but rather the one involving the least travel time and the most stay time on base for the astronauts.

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STATEMENT OF REV. T. BYRON COLLINS, S.J., ASSISTANT TO THE PRESIDENT OF GEORGETOWN UNIVERSITY

ACCOMPANIED BY:

DR. SAMUEL HARVEY, JR., ASSISTANT TO THE PRESIDENT FOR URBAN AFFAIRS AND FEDERAL RELATIONS

JAMES B. MICHELS, RESEARCH ASSISTANT, CLASS OF 1987, GEORGETOWN UNIVERSITY SCHOOL OF FOREIGN SERVICE

Senator PROXMIRE. Our final witness, our cleanup witness, is Father Byron Collins.

Father Collins, we are just delighted to see you here today. My youngest son is a second-year law student at Georgetown, I am proud and happy to say. He loves it. He thinks that it is the greatest school in the world.

Father COLLINS. We are delighted to have him.

With me is Dr. Harvey, and Jim Michael, a student who did the research on the presentation that is rather interesting.

Senator PROXMIRE. I want to congratulate you. This is the first time that I can remember any university bringing a student in, showing us what the real product is. That is very, very helpful.

Father COLLINS. I am going to have him say a few words because he is the one who did all the work on this paper. It is interesting, we are test firing on behalf of the space station.

Senator PROXMIRE. The space station?

Father COLLINS. Yes.

Senator PROXMIRE. Is that right?

Father COLLINS. Yes.

Senator PROXMIRE. It would be better if you were testifying on behalf of Georgetown, but go ahead.

Father COLLINS. We are for Georgetown's interest in it.

Let me answer a basic question you asked: Should the United States go ahead with the space station?

From Georgetown University's point of view, we think that it is not only a good thing, but essential. The Russians, as you know, have put up their own manned space station, and they call it Mir, meaning peace. It is their name. Peace in the Russian definition of the word is to be achieved when every nation belongs to the Soviet Bloc and the Soviet ideal of communism. That is the purpose of their whole government when they put up a manned space station.

INTERCULTURAL ASPECT OF SPACE STATION

Georgetown is interested and has worked with NASA on the intercultural aspects. We support the request for the funds for the planning of the space station because it is intercultural. The amount of money that the participating nations—the space station is not a U.S. enterprise, it is an enterprise of the European Space Agency, Japan, Canada, all of them have put up about $100 million, and we are putting up around $150 million, and the portion in which Georgetown has an interest, which is the intercultural understanding and training of businessmen, scientists, and politicians from different nations toward the real notion of what a space station must be if we are to have one that is different from the notion of Russia.

So basically, that is what our testimony is. It is in support of that function of the planning for the space station that deals with the university's participation in it, and we, as last year, would like encouragement, if possible, in the committee report for the humanistic and the intercultural aspects of the plan.

If it is left specifically and only to science, then we will be in the same field as the Russians, where it is a question not merely of science, but what are you trying to do with mankind. I think that it is the answer in a reasonable progression, with moneys available. I would specifically hope that the funds for the planning that is done with the other nations would go forward.

I would like to ask Jim Michels, a senior in our Foreign Service School, to tell us some of the courses that he has taken.

Senator PROXMIRE. Mr. Michels, do right ahead.

STATEMENT OF STUDENT JAMES MICHELS

Mr. MICHELS. I have been enrolled in a program called, science, technology, and international affairs, at Georgetown, and I have been taking courses, some excellent courses in diplomacy of outerspace, science, technology, and foreign policy, and mixed with this are science courses. We have been discussing institutions and methods of coming to international agreements on areas such as remote sensing, international cooperation in space, peaceful uses of space, and mixed with that are science courses, astronomy, and so forth, to have a better understanding of the international implications of cooperation in space.

Father COLLINS. So you can see that we have been in this for quite some time, by the very nature of our School of Foreign Service, and the School of Languages and Linguistics.

Before coming down, I looked up the definition of diplomacy, and you find that in the notion of Hermes, the messenger of the gods, diploma means two pieces of paper, and we have translated it into English and to a piece of paper that has printing on both sides in different languages that are achieving the same objective, and that is the purpose of our Foreign Service School, the relationships of governments representing people, people from different parts of the world are still the same, and it is part of Georgetown's effort to help see that they are the same. That is what diplomacy really is.

That, Senator, is the thrust of our testimony.

[The statement follows:]

STATEMENT OF FATHER T. BYRON COLLINS, S.J., ASSISTANT TO THE PRESIDENT OF GEORGETOWN UNIVERSITY

Mr. Chairman, members of the Commitee, I am Father T. Byron Collins, S.J., Assistant to the President of Georgetown University. I thank you for this opportunity to testify.

I would briefly like to express my support for the President's budget proposal for the National Science Foundation, in particular its higher educational research grants programs. Georgetown University receives essential research grants and fellowship support from the National Science Foundation as do most colleges and universities throughout the country. This funding for higher education is crucial in keeping the United States in the forefront of scientific research and advanced technologies.

I thank you very much for your consideration and this opportunity to testify today.

I am testifying today, as I have in the past, as a representative of Georgetown University, which by its very nature and tradition has concerned itself with the international/intercultural aspects of human experience. We applaud this committee for demonstrating a similar concern and commitment in the FY 1986 Appropriations Bill as it encouraged NASA to increase the involvement of higher educational institutions, such as Georgetown, in the development of ways in which to facilitate and enhance intercultural interfaces within the Space Program, especially with regard to the Space Station project.

At this somewhat precarious point in the U.S. Space Program, at a crossroads between past successes and shortcomings and future potentials, it is crucial that the United States, through NASA, commit itself to preserving and enhancing the working relationships we now have and will soon foster with other nations of the world. In so doing the future successes of the U.S. Space Program, and of the Space Station in particular, both in terms of scientific and technical achievements and improved international relations will be magnified. And now that the Soviet Union has placed its own permanently manned space station, Mir, into orbit and operation, it will be increasingly urgent for the U.S. and its allies to meet such new technological challenges together.

To accomplish this necessary atmosphere of cooperation, we feel that the United States must prove its dedication to progressing with the Space Station and other cooperative programs in a confident and reliable manner, showing the utmost respect for international commitments. Healthy and reliable funding for these international programs is one of the most important steps for achieving this confidence. In response to an invitation by the United States, the European Space Agency has committed itself to spending $30-40 million to Phase B of the Space Station Program, Japan $20-30 million, and Canada $15 million. These commitments must be met by United States appropriations in the next few years in order to secure the confidence of these our most important allies. We therefore urge this Committee to support the international programs of NASA in its budgetary deliberations.

We believe also that it would also be very prudent to continue and increase involvement of colleges and universities in the development of training programs for technicians, scientists, astronauts and officials associated with international projects of NASA on methods and attitudes by which international/intercultural dimensions may most fruitfully and diplomatically be undertaken for the benefits of all nations and individuals involved. Georgetown, with its strong background in international affairs and diplomacy studies, and with a program of Science, Technology and International Affairs already in being, is willing to be a focus and participant in any training or development programs along these lines.

On behalf of our President, Rev. Timothy S. Healy, S.J., we thank you again for this opportunity to testify.

RESEARCH AND DEVELOPMENT

FISCAL YEAR 1987 ESTIMATES

BUDGET SUMMARY

OFFICE OF SPACE STATION — **SPACE STATION PROGRAM**

SUMMARY OF RESOURCES REQUIREMENTS

	1985 Actual	1986 Budget Estimate	1986 Current Estimate	1987 Budget Estimate	Page Number
		(Thousands of	Dollars)		
Definition	155,500	230,000	205,000	260,000	RD 1-4
Utilization	(9,300)	(15,000)	(11,100)	(15,000)	RD 1-4
Advanced Development	(50,100)	(82,000)	(70,800)	(83,000)	RD 1-4
Program Management/Integration	(35,700)	(52,000)	(57,800)	(88,000)	RD 1-5
Operational Readiness	(2,900)	(7,000)	(5,300)	(17,000)	RD 1-5
System Definition	(57,500)	(74,000)	(60,000)	(57,000)	RD 1-5
Development	---	---	---	150,000	RD 1-5
Total	155,500	230,000	205,000	410,000	

Distribution of Program Amount by Installation:

	1985 Actual	1986 Budget Estimate	1986 Current Estimate	1987 Budget Estimate
Johnson Space Center	63,566	111,900	100,202	146,800
Kennedy Space Center	2,852	5,300	3,216	10,200
Marshall Space Flight Center	36,009	45,400	37,242	37,000
National Space Technology Laboratories	300	400	624	600
Goddard Space Flight Center	16,379	17,800	16,611	15,000
Jet Propulsion Laboratory	5,277	7,600	4,464	5,900
Ames Research Center	3,240	4,500	1,943	1,700
Langley Research Center	4,880	4,100	5,627	4,600
Lewis Research Center	16,734	26,800	20,769	20,500
Headquarters	6,263	6,200	14,302	167,700*
Total	155,500	230,000	205,000	410,000

*Development funds of $150,000 are shown at Headquarters pending decisions on the individual elements and related field center assignments.

OBJECTIVES AND STATUS

The Space Station will provide a unique capability to enhance the Nation's space science and applications program and to further the commercial utilization of space while stimulating advanced technologies. Development of the permanently manned Space Station, as directed by President Reagan, will follow a vigorous but deliberately-paced program plan which will permit us to maintain the preeminence in space our Nation has attained through various manned and unmanned programs.

The Space Station will be a multi-purpose, international facility providing a permanent human presence in space to conduct essential scientific and technical research, to support unique commercial activities and to perform operational tasks more efficiently in space. International participation in the Space Station program was encouraged by President Reagan in his 1984 State of the Union address. Canada, member states of the European Space Agency (ESA), and Japan have responded enthusiastically. Memoranda of Understandings (MOU) for the definition and preliminary design phase were executed with Canada, ESA, and Japan in the Spring of 1985 concurrent with the initiation of the NASA definition contracts. These international partners are undertaking parallel definition and preliminary design studies to identify Space Station elements that each of them may consider for development.

The Space Station will be designed to permit the system to evolve, as warranted, over time and to provide greater user utility and operational capabilities. Its manned and unmanned elements will be designed to facilitate on-orbit maintainability/restorability, operational autonomy, human productivity, and simplified user interfaces. Implicit in these objectives is the recognized need to optimize man/machine systems in space via automation, robotics and artificial intelligence technologies. During the definition period, NASA is conducting trade studies to evaluate various subsystems changes to the Space Station options. Changes to the reference configuration are being made to arrive at the optimum baseline configuration considering user requirements, systems efficiency, development and operations cost, and growth potential. Changes to the initial "power tower" reference configuration that have been baselined so far are: (1) dual keel; (2) "figure 8" module pattern; (3) 43.7 feet module length; (4) 14.7 psi cabin pressure; (5) assembly altitude of 220 nautical miles and a minimal operating altitute of 250 nautical miles; and, (6) 10 to the minus 5 g's microgravity level.

During the definition program, NASA is undertaking a Congressionally-mandated study to examine the feasibility of initially building and deploying a man-tended Space Station followed with a three to five year phase-in of a permanently manned capability. This study will be submitted to the Congress prior to the Administrator's selection of a baseline permanently manned Space Station configuration. All of the NASA centers and Space Station definition contractors are involved in this study which is progressing on schedule.

The Station and its platforms will be placed and maintained in low-Earth orbit by the Space Transportation System, thereby building upon the previous national investment in space. The initial launch of the Space Station elements will occur in the early to mid-1990's.

The definition and preliminary design phase will continue through FY 1987 and will provide the technical and programmatic plan for the Space Station program, including the completion of the detailed definition and preliminary design, the analysis and integration of national and international user community requirements, and the advanced development of technology options. A continuing emphasis on user requirements will be maintained throughout the definition phase as the preliminary engineering design evolves through subsystem advanced development and testing in dedicated test beds. Flight experiments on the Shuttle will be performed to prove system feasibility, and trade studies to optimize systems and operations will be conducted. This detailed system definition will provide assurance of achieving program objectives.

The development phase, beginning early in FY 1987, will include establishing system design requirements and performing detailed analysis for the initiation of the design and layout of the modules and subsystems, the design of ground support equipment and government furnished equipment, and the design and plans for tooling and manufacturing processes.

CHANGES FROM FY 1986 BUDGET ESTIMATE

The FY 1986 budget estimate of $230 million was reduced in the Congressional review process by $25 million to $205 million. In addition, Congressional direction required that $5 million be added within the available funding for advanced technology work in support of delivery of a flight telerobotic system for a mobile remote manipulator and a smart front-end on the Orbital Maneuvering Vehicle to be used for remote operations and servicing.

To accommodate the effective $30 million budget decrease in the original budget plan, reductions and reallocations were made within the six definition phase functional areas.

Reductions in Utilization were taken in all five discipline areas. These reductions were achieved by eliminating parallel efforts between work package contractors and centers and by consolidating specific discipline definition efforts into common generic tasks that addressed the concerns of science and applications, commercial, and technology accommodations. The reductions in Advanced Development touched all technology areas. The effect of these reductions is the elimination of some technology options earlier than originally planned. For example, in the power technology area, all tasks relating to advanced solar arrays have been terminated including the flight experiment designed to study the interactions of space plasma with high voltage solar arrays. Similarly, in the propulsion/fluid management areas, the flight experiments to establish cryogenic fluid transfer (liquid helium) techniques have been eliminated. Examples of reduced tasks are a two-phase thermal control flight experiment and the data managment test bed engineering and operations tasks. The Program Management/Integration area was increased due to higher usage rates of facilities and equipment in various laboratories, such as the crew systems lab, the structures lab, and the antenna test range, as well as increased efforts in documentation and configuration management support. Reductions in Operational Readiness were achieved by reducing or eliminating parallel efforts between centers and by deferring some tasks into FY 1987. Parallel maintainability plan tasks were eliminated and facilities/ground systems tasks deferred into FY 1987. In the System Definition work, the reduction resulted in delays of portions of the definition and preliminary design contract deliverable products and studies into FY 1987.

BASIS OF FY 1987 ESTIMATE

This estimate provides for the initiation of development efforts as well as completion of the definition work, including the technology assessments, and the eight contracted studies begun in April 1985.

Utilization -- To ensure responsiveness to the national and international user community, customer advocacy groups established early in the program will continue to work with users to further define their requirements in the areas of science and applications, commercialization, and technology development. Other user requirements to be defined are: on-board accommodations; support for assembly, staging and servicing spacecraft; and maintainence or modification of equipment. The definition of consistent and user friendly interfaces is a key activity in FY 1987. Interface work will include the definition of access procedures for arranging for services, provisioning/replenishment requirements, and the methods for retrieval and protection of products, and/or data of both a scientific and technical nature. Definition of the user operational requirements will also be a focus of the Utilization program.

Advanced Development -- This activity provides for the continuing development of advanced technology options that are reliable and cost effective and will ensure that the initial Space Station configuration incorporates provisions for growth. Examples of key technologies on which work will continue in FY 1987 include: solar dynamic power generation and energy storage; regenerative life support system; food/hygiene technology; man/machine interfaces and work integration; two-phase thermal bus and two-phased fluid systems, material tests, and dynamic tests of representative structural elements. This effort is being conducted to validate the operation of selected technology options in the environment to which they will be exposed when incorporated in the Space Station.

Automation and robotics technology is applied throughout the advanced development effort. The limited crew size in the initial station dictates a development scenario that will result in maximum autonomy from the ground and a high level of automation and robotic activities. In FY 1986, Congress directed NASA to undertake an automation and robotic effort that will be continued in FY 1987.

Program Management/Integration -- This effort provides for the management and integration of all elements of the Space Station program including the input from international participants. The major components of this activity are the systems engineering and integration (SE&I) effort, the Technical and Management Information System (TMIS), and program support activities.

The SE&I effort includes the systems engineering and analysis of technical requirements and alternatives; the definition and integration of all elements that comprise the program; and the development of the master data base and the engineering master schedules. TMIS will be an integrated system of hardware, software, and procedures to collect, organize, and distribute engineering and management data among NASA centers, contractors and international partners. The program support activities provide management, technical, and institutional support from the individual centers necessary to sustain the development activities of the Space Station.

Operational Readiness -- The definition effort for operations includes the development of plans, requirements, and preliminary designs for the major operational support systems of integrated logistics management, space systems operations, launch/return operations, and user operations. International involvement and operational roles and missions will be assessed. The objective of all these activities is to insure the total operational readiness of the Space Station system, including platforms and ground support elements, in order to conduct a variety of scientific, technological and commercial missions.

System Definition -- Eight system definition contracts were initiated within four separate work packages in April 1985 for the initial definition and preliminary design of the Space Station and its evolution. Completion is scheduled for early FY 1987. In addition to permanently manned features, the contractors are also studying a man-tended approach which phases into a permanently manned capability. The contractors are also supporting the NASA SE&I activity by defining the configurations, interfaces, and functional requirements of individual system elements.

Development -- The development phase includes the contractor effort work packages, supporting development activities such as the NASA SE&I, the software support environment, and the evolvement of operational planning. Some of these supporting development activities will commence early in FY 1987. The SE&I effort will be performed primarily by civil service personnel at the Johnson Space Center with additional SE&I

support provided by other NASA centers. SE&I activities will include system requirements and analyses; interface design and control; and safety, reliability and quality assurance requirements. The engineering master schedule and other key systems level schedules will be expanded and maintained, systems level assembly and check-out logic will be refined, and systems level verification requirements and procedures will be established. The software support environment activity will provide the infrastructure for the development of common applications software required for flight and ground systems. Other supporting development activities to be performed by the Government with contractor support include the initiation of procurement of government-furnished equipment and the design of the ground support equipment. The ground support equipment will be required during the processing flow of the Space Station system for system level integration, test and check-out, as well as for processing and integration of payloads.

Work package contracts for the development phase are planned to begin incrementally, starting in mid-FY 1987. This contracted effort, as currently contemplated, will be divided into four major categories, which may be adjusted as a result of the definition studies and/or international participation. Present planning calls for one category to include the common modules, the environmental control and life support systems, the outfitting of laboratory and logistics modules, the auxiliary propulsion systems and related applications software. A second category will consist of the distributed systems (including communication and tracking, data management systems, thermal system, mechanisms and the connect/interconnect module); trusses and other structural items; the guidance, navigation and control system; the resources integration and Shuttle interface analysis; and, related applications software. The third category includes the platforms, the facilities and techniques for the servicing of free flyers and other space hardware, as well as the outfitting of laboratories and related applications software. The final category consists of the power generation, power storage, and power management and distribution.

The design and development of the modules, structures, distributed subsystems and platforms will be phased to optimize fabrication, assembly and checkout flow times to support an initial launch of Space Station elements in the early to mid-1990's.

[From the Washington Post, April 1, 1986]

OTHER NATIONS STEP UP SPACE PROGRAMS

By Jack Anderson and Joseph Spear

While Washington's second-guessers and hand-wringers anguish over the Challenger tragedy, other nations are scrambling to overtake the United States in space. Here's what has happened since the shuttle explosion immobilized the National Aeronautics and Space Administration.

The Soviet Union launched a space station, which will become the core of a huge space complex, with laboratories, manufacturing facilities and living quarters. By contrast, there are mutterings in Washington about canceling the U.S. space station project—which couldn't be deployed, in any event, until the mid-1990's.

The Soviets have offered the use of their Proton rockets, at a launching price of $24 million, which customers may use if they get tired of waiting for the U.S. shuttles to take off again. The Soviet price per customer is less, incidentally, than it costs for a shuttle-launched satellite.

The European Space Agency has launched two satellites since the shuttle disaster. Shuttle customers, left stranded, have been invited to sign up with the European agency. It has offered to add four more Ariane rocket launches in 1987–88.

Britain, France, and the Soviet Union have intensified work on manned spacecraft. The Soviets have already tested a small spaceplane that would ride into space atop a booster rocket, spring into orbit, and then return to Earth. Japan is rushing ahead with space plans. China is making available its Long March rockets for commercial use.

All the while, the investigation of the Challenger explosion, fanned into a national scandal by an aggressive news corps, has demoralized NASA and bogged down the U.S. space program.

Reporters jumped on NASA for ignoring warnings and taking risks that may have been unwise. But NASA's files are full of self-serving memos routinely written by cautious officials to absolve themselves from blame. If a launch is successful, they can bask in the acclaim. If it should fail, they can cite their I-told-you-so memos.

The top people at NASA always have understood that space pioneering has its risks, that progress has a price. They have been careful to give top priority to safeguarding human life. Their safety record is impressive; by many measurements, they have actually made space exploration safer than airplane or automobile travel.

If NASA must guarantee safety, it will simply have to stop all space flights. Engineers will protect themselves by citing all the things that could go wrong and warning against every launch. Officials will be afraid to ignore the warnings and will no longer take risks.

Such a play-it-safe atmosphere would likely drive out of NASA the most resourceful people who have kept the United States on the cutting edge of space technology. About 40 percent of the top people are eligible to retire, most of them on full pension. If they can no longer explore space without risking personal ruin, they may simply walk out.

Then NASA would become blighted with the bureaucratic curse it has avoided—the curse of inertia and passivity—and become another Washington structure more interested in sustaining itself then promoting the national welfare.

EDMUND A. WALSH SCHOOL OF FOREIGN SERVICE, GEORGETOWN UNIVERSITY

REPORT OF THE DEAN—1985

PROGRAM IN SCIENCE, TECHNOLOGY AND INTERNATIONAL AFFAIRS

The public and private sectors of the United States are increasingly aware that exponential changes in science and technology carry profound implications for the entire international community which will require new understandings, new precedents, and new types of international specialists. Both sectors will require, in the years ahead, a corps of professionals who combine training in foreign affairs, intercultural studies, languages, national security, and/or international finance and commerce with literacy in science and technology.

The School of Foreign Service's program in Science, Technology and International Affairs integrates the study of national defense, international affairs and international business with knowledge of the elements of science and technology. The purpose of this interdisciplinary education is to prepare young men and women who understand the implications of technological advances for national security, diplomacy and national competitiveness. The hope is that they will be ready, by virtue of their education, to seize the opportunities for greater international cooperation or to resolve the international tension created by advances in science and technology.

Having initiated work on the Program in Science, Technology and International Affairs as early as 1974, the School's vision predated the current interest in this field. Founded on University resources in 1983 and bolstered by the interest and support of the National Aeronautics and Space Administration, the Armed Forces Communications and Electronics Association, RCA, and most recently the Fund for the Improvement of Postsecondary Education of the Department, the Program in Science and Technology is now an integral part of the School of Foreign Service curriculum. Its future development rests, in many ways, on its present merit.

As an undergraduate interdisciplinary major, the Program in Science, Technology and International Affairs is structured around four major components: 1) the basic principles and methodologies in the natural sciences, mathematics and computer science; 2) the exploration of specific technologies, such as telecommunications, and their political, military, economic, social or international ramifications; 3) the value assigned to scientific and technological innovation by different cultures, with particular curricular and technical foreign language course development focusing on the Soviet Union, Japan and China; 4) and the processes and institutions in the international system by which issues of science and technology are addressed, in both the public or private sectors.

Over the past months, the School of Foreign Service has continued to strengthen and refine its curriculum in Science, Technology and International Affairs. Within the required core curriculum of the freshman and sophomore years, two new features have been introduced that should stimulate interest in the upperclass concentration. A strong history of science component was incorporated into the new freshman history requirement in "Characteristics of Western Civilization" and a new sophomore seminar on "Science, Technology and Politics" was developed by a member of the Government Department.

Course development and/or revision is proceeding within each of the four major categories of the field in Science, Technology and International Affairs. For example, within Group 1, the initial offering in "Computer Literacy for Foreign Service" has been significantly upgraded to a computer applications course to take advantage of the prior preparation of our students in this area. The mathematics requirement has also been subject to review; a course on "Discrete Mathematics and Applied Calculus" is being designed with specific scientific applications for introduction in the 1985-1986 academic year.

In Group 2, which provides the linkage between specific technologies and the international system, a new course entitled "Fundamentals of Advanced Technology" will be introduced next semester by a member of the Physics Department to impart a basic understanding of the scientific and technical aspects of a number of technologies affecting national security, international trade and competition, and global social values. It will explore basic computer components and techniques, computer systems applied to both telecommunications and automated manufacturing processes, aerospace, biotechnologies and problems of intangible technologies such as intellectual property and software. This survey will provide an important building-block for the other courses within this group, some of which were also introduced over the past year: "Technology, Economics and International Affairs" explores questions arising from the manipulation of science and technology by nations, the impact of the importation and transportation of scientific and technological advancements, and the economic and military implications of such transfers; "The Diplomacy of Outer Space" examines the nature of space as it relates to the various interests of nations and the wide range of diplomatic issues that arise in connection with its uses and benefits, is being taught for the second time.

Although Group 3 courses examining the cultural receptivity to advancements in science and technology in international affairs have been well-grounded from the beginning in the history and philosophy of science, the School has been eager to expand this area to provide comparable coverage to systems that diverge from the Western tradition. The appointment of a new full-time faculty member in Asian Studies has allowed the introduction of a course in "Science, Technology and Asia, focusing on China, Japan and the Soviet Union. Under the auspices of the Georgetown University National Resource Center, initial planning has begun for upper-level seminars on the scientific and technological culture of these great powers, each of which will be complemented by technical foreign language courses.

Finally, in Group 4, courses have been introduced on "Science, Technology and Diplomacy," and "Science, Technology and the Foreign Policy Process." The first addresses science and technology as instruments of power in both the cooperative and competitive aspects of foreign policy implementation; the latter emphasizes their growing significance in foreign policy formulation. Both courses are being taught by faculty members who combine academic and professional credentials.

Looking ahead, a sub-committee of the School's Curriculum Committee was formed to review the Program in Science, Technology and International Affairs in light of the first two year's experience and to initiate a long-term planning process for its development over the next five years. Drawing faculty from the departments of history, international affairs, including the Landegger Program in International Business Diplomacy, and physics as well as practitioners from the National Science Foundation and the International Affairs Office of NASA, this committee will scrutinize this distinctive educational program from the vantage of both educational validity and professional preparation.

Nine students have graduated from the Program in Science, Technology and International Affairs in its first two years. Of these, two are proceeding smoothly through the Foreign Service entry examinations, two are employed in marine and agricultural affairs, and five are attending professional graduate programs in law, engineering and architecture. Approximately twenty additional students are currently pursuing this field of concentration and over one hundred students from other areas such as International Economics and International Politics are enrolling annually in individual courses that inform their majors.

The School of Foreign Service is recognized as pioneering the advances in education for future leaders to understand the new international agenda of science and technology issues. Its location in Washington, D.C. has lent itself to discussions with the National Academy of Science, the Foreign Service Institute, and the Air and Space Museum. Students are complementing their academic inquiry into this field with internships in the International Affairs Office of NASA and COMSAT and with summer employment or internships with corporations such as AT&T International, Data Resources, ITT and IBM.

Moreover, with the assistance of NASA, AFCEA and the Department of Education, the School of Foreign Service has inaugurated a complementary outreach program of symposia and seminars. Last February, it joined with the Institute for the Study of Diplomacy to host a symposium on "International Affairs Education for the Technological Revolution" that brought educators together with representatives from U.S. government and business as well as the diplomatic community. This year, it will co-sponsor with the Kennedy Institute of Ethics a conference on "The International Implications of Biotechnology" and with AFCEA a symposium on "The Diplomacy of the Strategic Defense Initiative." The School's Landegger Program in International Business Diplomacy is also organizing lecture series on advanced technology and international public policy for students and business and government representatives.

Senator PROXMIRE. Father Collins, would you say that the space station's purpose is primarily for peace?

Father COLLINS. It must be, Senator.

Senator PROXMIRE. Then why don't we get together with the Soviet Union, find a way of agreeing with them to build a space station together. Let them pay for half, and we would pay for the other half with the other nations.

Father COLLINS. That would be the ideal, I agree. I just think that if we could ever get the Russians to put the word "Mir," and the the dash "Liberty" as representing our Statue of Liberty, we would achieve what may be something along those lines.

Once you get into space, the astronomers of the world, and there are about 250 of them, they work together. The Russians have about 50 astronomers that meet with 50 U.S. astronomers, and 100 from the rest, and they meet together as men of science. They plan where the next astronomy center will be, and they do it as a unit, nations are set aside. If we ever could get that, you are correct, we could drop off all the money we are spending on the star wars and put it to a function that would be a much better function for mankind.

Senator PROXMIRE. Here is the problem that bothers me, Father Collins. We have a situation where the Under Secretary of Defense for Research has told us that in the 20 most important technology areas, military technology areas, with respect to the military, the United States is ahead of the Soviet Union in 14, we are tied in six, and they are ahead in none, zero, zip. We don't have to worry, it seems to me, at least for the time being, about being overwhelmed with the excellence of the Soviets in technology as far as the military is concerned. That is what the Defense Department, that is always saying that the Russians are ten feet tall, says about their technology, we are ahead of them.

Now when it comes to this completely peaceful operation, I can't for the life of me understand, if you say that they have so much more resources that they are putting into this space station, why it can't be a cooperative venture, and we just ought to do everything we can to achieve that.

From everything that we have heard about our European allies, they would like that.

Father COLLINS. Yes; something along those lines. This is where I think you, as a Senator, if you can persuade the other members, could put something in the committee report. That is what I have been trying to push myself and saying: If you make it only science, we are not going to get done what should be done with the space station. It must be a humanistic understanding between nations that achieves a goal of working together.

My plea for the continuation is in the testimony as recorded is that the amount of money the other nations have started toward this end, that this keep going. I would add your point, there is no reason why, if you ask the National Science Foundation, who funds the astronomical efforts of men from all over the world, including Jesuits, why don't they try and reach in through the Russian astronomers. I know some of them, and they are separate from the government, too, in the sense that the government recognizes that these men are so preeminent that they don't try to control them. They work as a very close intellectual group.

Senator PROXMIRE. I am glad to hear that, and I think that we are not far apart.

Let me say, this is an appropriations committee, a funding committee, and I am struck by your figures that we provide $150 million or so for the space station, and the Soviet Union $100 million.

Father COLLINS. No, the other nations that are presently in our program provide $100 million.

Senator PROXMIRE. I misstated that. It is $150 million by the United States, and the other nations, Japan, the United Kingdom, Germany, or whatever, are providing $100 million.

Father COLLINS. Right.

Senator PROXMIRE. That is ridiculous, they should be providing far more than we do, they have a bigger national product in the aggregate than we do. When you take something like the International Monetary Fund, we contribute about 20 percent, and other nations contribute 80 percent, because of the aggregate difference and the total capability. We provide more than any other nation, but in the aggregate the other nations provide more than we do. The World Bank, the same kind of situation, we provide a minority of the funds. The United Nations, the same thing, we provide about 20 percent of the funds.

It seems to me, on the space station, in view of the fact that they have resources, that they are going to benefit, that the technology is going to be worldwide, that peace has the same attraction and benefit for other nations as it has for us, why should we provide so much more than all of the other nations combined for the space station?

Father COLLINS. Because our businessmen are greedy. If you split the pie up, so France, Japan——

Senator PROXMIRE. Let the businessmen pay for it.

Father COLLINS. No. We have capabilities that the other countries be allowed more than the United States. The United States. has the big piece of the pie.

I agree with you, and I would just urge that some place a few kind words be put in that this be looked at, the humanistic element, the intercultural element be included in part of what the businessmen are talking about. These are businessmen, and we have one of the men at NASA who is teaching at Georgetown, so I am somewhat prepared in this portion of it. I know something about it.

I would urge that it might be interesting to ask NASA to put out what is the definition of our notion of space station. The Russians have called theirs Mir. The portion that France has of it is called Columbus. They are trying to get their people to see that they are participating.

Senator PROXMIRE. Thank you very, very much, I appreciate this. I have only been presiding here for a few minutes, this is, of course, chaired by the Senator from Utah, Senator Garn, and I have certainly enjoyed very much the testimony.

I am delighted to see that Dr. Wirszup has remained because I think he did a fine job in his presentation. He has opened my eyes as far as the education situation is concerned. I am sure, Father Collins, you are aware of that problem.

Father COLLINS. Yes; it is bad.

Senator PROXMIRE. I think that your contribution and the contribution of your student have been very helpful. Thank you so much.

Father COLLINS. Thank you very much.

SUBCOMMITTEE RECESS

Senator PROXMIRE. The subcommittee will stand in recess until 1:30 p.m. this afternoon.

[Whereupon, at 11:32 a.m., the subcommittee was recessed, to reconvene at 1:30 p.m. the same day.]

(AFTERNOON SESSION, 1:30 P.M., WEDNESDAY, APRIL 30, 1986)

NONDEPARTMENTAL WITNESSES

OPENING REMARKS

Senator STENNIS [presiding]. All right, ladies and gentlemen, the hearing will come to order.

First I want to extend a warm welcome to each of you that are here in whatever capacity, either as a witness or as to any purpose that you came. I wish that there was the time for us to give each of you more than is allotted, but this is a big country, you know. There are a lot of people in America.

The fact that it is important enough to call the hearings to be held and to have you people that are interested and that are knowledgeable, to give you the chance to give your views and explain the motives or the purpose of the programs and to record a record here and make it available to the public and to all who might want to read it, this is all important.

As I said, I am sorry that we couldn't allot you more time. We will have to ask you to live within that time, if possible. If I have to call your attention to your time being over, I don't want you to feel bad about it. I am not going to feel too bad about it. This will make it possible for us to have a hearing for all.

Our first witness here this afternoon is going to be a Mr. French Wetmore of the Association of State Floodplain Managers, Inc. He is the chairman.

Mr. Wetmore is here. I have just had the privilege of shaking hands with him. I am now going to ask him to please proceed.

FEDERAL EMERGENCY MANAGEMENT AGENCY

STATEMENT OF FRENCH WETMORE, CHAIRMAN, ASSOCIATION OF STATE FLOODPLAIN MANAGERS, INC.

Mr. WETMORE. Thank you, Senator.

Senator STENNIS. Please proceed.

Mr. WETMORE. As you said, I'm the chairman of the Association of State Floodplain Managers, Inc.

I want to thank you for the opportunity to testify on the fiscal year 1987 budget request for the Federal Emergency Management Agency.

We have submitted written testimony. With the committee's permission, I would like to make some additional oral statements for the record.

Senator STENNIS. Yes.

FLOOD DAMAGES

Mr. WETMORE. The association is an organization of professionals involved in State and local floodplain management. Our members come from all 50 States and we are concerned with the tremendous flood damages that are inflicted on the country every year.

The cost of this flooding is much more than what appears in the Federal budget. In addition to the cost to FEMA, the disaster assistance and flood insurance claims, the State and local governments pay for flood fighting and flood control and business pays also when they're closed down and they may be closed down for good.

Senator STENNIS. Could you move the microphone closer, please?

Mr. WETMORE. There are many additional costs to the property owners that aren't covered by insurance.

Last year, for example, there were 150 people killed by floods. The last time that total flooding cost to the Nation was added up was 1975 it was estimated at $3.5 billion. This number has been increasing since then as more homes and businesses are built in flood plains.

Our association wants to stop the increase in the flood damages and the government expenditures for flooding. Our members work every day to try to prevent improper flood plain development and to assist property owners in finding ways to reduce their damages.

FEMA has two programs that help us. One is the National Flood Insurance Program. The other is the Hazard Mitigation Program.

These programs, however, will only work if there is good and close State and local cooperation at the time with the Federal Government.

Our major concern is the current direction of the National Flood Insurance Program.

FLOOD INSURANCE

This program was created to provide a Federal subsidy for flood insurance for flood plain residents. Now, in return, the local governments promised to regulate new construction.

The flood plain regulations by local officials can be very controversial and difficult, especially when the local economy needs more businesses or industry that the mayor then must tell them that they cannot build what they want to in the flood plain.

As long as the residents in the town want the flood insurance then the local official will hold up his side of the bargain with the Federal Government to make sure that the flood plain development proceeds properly.

Up until 1981 it was very obvious that the people wanted flood insurance. For example, between 1976 and 1981 the total number of policies doubled from one to two million.

The Federal law requires that the recipients of mortgages and improvement loans on flood plain property buy flood insurance. Therefore, properties change hands; when they do, the total number of policies could increase every year.

However, in 1981, this trend in the increase of insurance policies stopped.

The Federal Insurance Administration had set a goal for itself to make the program self-supporting by 1988. They had decided on three ways to do this. Raise the insurance rates, cut coverage, and increase the policy base so one bad local type flood would not hurt the national fund.

Since 1981 the series of rate increases and coverage cuts has resulted in the fact that the total number of policies has not gone beyond the 1981 level.

People are telling our members they are dropping their flood insurance policies. Even with subsidized rates, flood insurance costs more than multirisk homeowners' insurance, that they get less coverage and higher deductibles.

Our main concern is that the local flood plain managers and elected officials will not be as interested in property; that is, in proper flood plain management as residents become more and more dissatisfied with the insurance programs.

We are especially concerned that the Federal Insurance Administration has just announced another 22-percent rate increase. Last year they asked for a 14-percent rate increase.

In fiscal year 1986 the Appropriations conference committee directed the Federal Insurance Administration to keep the rate increase below 5 percent.

Now with the latest increase proposal we are back this year and we are asking that your committee take a similar step again.

The flood insurance program is a good program. We do support it. We work hard for it.

We would also like to voice our support for two other key hazard mitigation programs that are in the FEMA budget, Mr. Chairman.

SECTION 1362 PROGRAM

First is the purchase of a property line item in the national flood insurance fund. This is also known as the section 1362 program. This program buys severely or repeatedly damaged property. It not only saves on flood insurance but this helps flood victims get out of harm's way. I would like to see a higher level of funding in this program.

In a previous report here to Senator Garn, it stated that the need for the program is roughly three times the amount of the current funding level.

The third statement that we would like to make is that we support the testimony that you will be hearing later today from the National Emergency Management Association and the National Coordinating Council on Emergency Management. This is talking about their concerns for training programs of local officials and mitigation programs.

There is the particularly interesting statement of the National Emergency Management Agency is supporting hazard mitigation that we, at all levels of government, have the choice of paying now or paying later.

As to proper flood plain management and hazard mitigation, if we pay the price now we will reduce the expenditure in the future for flood damages.

Again, I do appreciate the opportunity to present our concerns today and I will be happy to answer any questions that you have.

Senator STENNIS. All right, Mr. Wetmore. We thank you for your testimony.

Mr. WETMORE. Thank you, Senator.

PAYMENT OF FLOOD INSURANCE CLAIMS

Senator STENNIS. I would like to point out that your testimony implies that FEMA is requesting an appropriation of $324 million to pay flood insurance claims. That's not the case. No new appropriations are requested for the fiscal year 1987 flood plain which are estimated to be at $324 million. Such a request is not made.

What would be the increase to the average flood insurance policy holder premium if the 27-percent increase that you have mentioned were implemented? Do you have a figure for that, Mr. Wetmore?

Mr. WETMORE. Yes, sir.

Senator STENNIS. What is that?

Mr. WETMORE. On the increase the current average annual policy is $215, and if there were a 27-percent increase that would raise it to $275. The actual proposal in the Federal Register was not that high. That was only a 22-percent increase, which is roughly $262. It is quite a high increase. We have to still make up, that is, they have to still make up the other 5 percent somehow. That has not been decided as yet as far as we know.

On the concern on the appropriations for insurance claims, that was our mistake the way it was written. It sounds like it is an appropriation. It is not, as you mentioned.

Senator STENNIS. Yes.

Mr. WETMORE. We would like to reiterate that it does show that flooding is quite expensive, that the Federal agency has to worry about $324 million in claims. Of course, there are much more damages not covered by the insurance claims that we are concerned about.

Senator STENNIS. Yes.

Mr. WETMORE. We are also concerned about that, too, Mr. Chairman.

Senator STENNIS. All right. We thank you very much for your testimony.

Mr. WETMORE. Yes, sir.

Senator STENNIS. If that is not all of your testimony, you may insert the rest of it in the record at this time, Mr. Wetmore. Senator D'Amato's statement is also included.

Mr. WETMORE. Yes. Thank you.

Senator STENNIS. Thank you, Mr. Wetmore.

[The statements follow:]

STATEMENT OF SENATOR D'AMATO

Mr. Chairman, I am pleased to join you again for the public witness testimony of fiscal year 1987 appropriations for the U.S. Department of Housing and Urban Development, National Science Foundation, National Aeronautics and Space Administration, and the Federal Emergency Management Agency.

I would like to reiterate my strong support for programs sponsored by the U.S. Department of Housing and Urban Development that promote safe, decent, and affordable housing for our citizenry. I would like to see the continuation of all of the vital programs that I mentioned in my statement yesterday.

In addition, Mr. Chairman, math and science education programs of the National Science Foundation are vitally important for further development of our children. Television programs that focus on teaching our children new skills and advancing their capabilities in the sciences are an invaluable way of teaching our children. For these and other reasons, I am a strong supporter of science education programs for our youth at the elementary through graduate school years. In order to advance these programs, I continue to support legislation in the Congress that calls attention to the importance of science and mathematics education.

It is essential that we continue to heighten public awareness and commitment to technologies that make this country strong and prosperous. We need programs that stimulate student interest in science and mathematics which is vital for continued U.S. technological strength and development. Therefore, I am pleased that the National Science Foundation and other Federal agencies are addressing science and math education. I will continue to fight on behalf of our Nation's academic and research facilities which strengthen our Nation's scientific position.

The fiscal year 1987 appropriations for programs of the U.S. Department of Housing and Urban Development, National Aeronautics and Space Administration, National Science Foundation, and the Federal Emergency Management Agency should promote our efforts to make America strong and prosperous. The comments of the witnesses today will serve an important role in promoting activities and refining programs of Federal agencies that benefit our citizenry. I thank the witnesses for participating in this important process.

Thank you, Mr. Chairman.

STATEMENT OF FRENCH WETMORE, CHAIRMAN, ASSOCIATION OF STATE FLOODPLAIN MANAGERS, INC.

The Association of State Floodplain Managers is the only national organization of state and local officials responsible for managing flood-prone areas. We represent those agencies that implement the floodplain management aspects of the National Flood Insurance Program. We are also active in flood hazard mitigation and other activities to reduce and prevent flood damages.

In its proposed budget for fiscal year 1987, the Federal Emergency Management Agency (FEMA) is asking for $100 million in disaster relief, most of which usually goes to pay for flood damages. FEMA is also asking for $324 million to pay for flood insurance claims. It is the basic goal of our organization to reduce flood damages and thereby reduce these federal expenditures.

FEMA manages two types of programs that directly affect our responsibilities. The first on which we would like to comment are the flood hazard mitigation programs. These include the following line items:

Comprehensive Emergency Preparedness Planning
  Hurricane Preparedness: we support continued funding at the proposed level.
  Dam Safety: we support continued funding at the proposed level.
  Hazard Mitigation Assistance: we support additional funding for this program which has proven to be very effective and innovative by building on local concerns for flooding to promote comprehensive hazard mitigation.

National Flood Insurance Fund
  Flood Studies and Surveys: we support continued funding at the proposed level.
  Flood Hazard Reduction: we support continued funding at the proposed level.
  Purchase of Property: we support increased funding. A FEMA report on this program demonstrated that three times the proposed funding level is needed.

Disaster Relief Fund: Disaster Preparedness Improvement Grants: we support continued funding at the proposed level.

Training and Education: we support the positions of the National Emergency Management Association and the National Coordinating Council on Emergency Management against cutting student travel and stipends.

All of these programs have more requests than funds available. Each of them pays its own way by reducing property exposure to hazards or by improving the skills of those responsible for managing emergencies.

The second program we would like to address is the National Flood Insurance Program (NFIP). The NFIP sets minimum standards for local regulations needed to make flood insurance available in a community. The NFIP has been a model program whereby the federal government provides financial incentives through subsidized insurance to obtain local and state management of floodplain development. Proper management of floodplain development is necessary if we want to reduce the federal expenditures for flood insurance and flood relief.

We do have two important concerns about how the NFIP budget affects floodplain management.

1. Eighteen years of experience with the NFIP has shown us that continued community assistance is vital. Without professional advice and assistance from the states or FEMA regional offices, local officials may misconstrue their responsibilities to regulate floodplain development or elect to neglect them. The future of the program and its financial well-being depend upon strong and effective local floodplain management.

In the past, FEMA appropriations had a line item for the State Assistance Program. This program provided funds to states to assist communities to understand and enforce their floodplain management obligations. During this fiscal year, the State Assistance Program was replaced by the Community Assistance Program which has similar objectives and is financed by the "Flood Hazard Reduction" line item.

FEMA regional office staffs and travel budgets are getting smaller. With less capability for FEMA staff to provide community assistance, we are concerned that this vital link in the program not be weakened. We need more assurance that this program will not get lost as it is funded under a different heading. Therefore, we request that the record show that the "Flood Hazard Reduction" line item includes funds at the same level as previous years for contracts with the states to provide direct assistance to communities.

2. Our greatest concern with the budget is the proposed rate increase that will be necessary to make the National Flood Insurance Fund fully supported by policy holders' premiums in 1987. To do this, the ratio of income over expenses needs to be increased by 27 percent. The Federal Insurance Administration (FIA) has proposed a 22 percent increase in the subsidized rates for existing homes. FIA has not yet explained what additional changes in coverage and deductibles will be proposed to reduce expenses to reach its 1987 goal.

This Association has strongly opposed large, abrupt rate increases in the past and we continue to do so. In 1985 the average annual premium was $215. A 22% increase will raise it to more than $260. Our members have received many complaints from policy holders that their flood insurance costs more than their multi-risk homeowners insurance. When policy holders see larger deductibles and lose their coverage for their basement property, they tell us that flood insurance has become a "bad buy".

The NFIP policy figures reflect this concern. FIA estimates that there are 6-8 million buildings in the nation's floodplains and there are only two million flood insurance policies in force. As these buildings receive new mortgages and home improvement loans, federal law requires the owners to purchase flood insurance. If only 10% of the 4 million uninsured buildings are bought or improved each year, the total number of policies should increase by 400,000 annually.

This is not happening. In fact, when the recent series of rate increases began in 1982, there were 1.9 million policies in force. This number then dropped and has only been brought up to 2 million in the last year. It can be seen that people are not voluntarily buying flood insurance and those who have policies are not renewing them.

As more expensive flood insurance becomes more unpopular, we predict two long term results. First, there will be less incentive for communities to maintain their side of the agreement with the federal government to properly manage floodplain development. As long as rates are reasonable, owners will encourage their local officials to stay in the NFIP. If residents do not want flood insurance, their local officials are more apt to bow to development pressures and allow new construction to aggravate the flooding problem. Second, as insurance coverage drops, more of the cost of flooding will be picked up by other federal, state and local disaster assistance programs.

In 1983, the General Accounting Office reported to Congress that such increases "could be harmful to program objectives by reducing participation and increasing the use of disaster assistance" (GAO/RCED-83-53, page 31). When it approved FEMA's fiscal year 1986 budget, your Committee of Conference agreed with these concerns and directed that the 1986 rate increase be limited to 5%.

We are also concerned that FIA does not devote enough attention to what we consider the best way to make the National Flood Insurance Fund self-supporting: to reduce damages to flood-prone property. We have recommended many activities to do this and we volunteered to assist in implementing them. These include: advising all policy holders on how to protect themselves from flooding, providing financial incentives such as insurance rate breaks for floodproofing homes, providing a rating incentive to communities that initiate damage reduction measures, and devoting special attention to high loss areas.

These activities should be tried before the agency resorts to more rate increases and coverage cuts. However, our latest series of suggestions brought no invitation from FIA to pursue them. For example, we volunteered to assist in preparing a "Community Rating System". The Community Rating System was initially an FIA proposal to adjust flood insurance rates to reward or penalize communities with good or bad floodplain management programs. FIA's response is that the idea is still under study, a condition it has been in for several years.

In summary, we have three comments about the proposed Fiscal Year 1987 budget for the Federal Emergency Management Agency:

1. Continued funding is needed for the flood hazard mitigation activities and more funds are needed for the training and education and Section 1362 purchase of property line items.

2. We request tnat the record show that FEMA will continue to fund a program for state assistance to communities.

3. We continue to oppose substantial rate increases, including the recent 22% proposal.

We are unable to support another substantial increase in flood insurance costs or reduction in coverage because of the adverse effect on floodplain management efforts. The National Flood Insurance Fund may become self supporting but in the long run, without a greater effort to reduce flood damages, the federal taxpayer will continue to pay the costs of flooding.

National Science Foundation

STATEMENT OF CYNTHIA H. NULL, EXECUTIVE DIRECTOR, FEDERATION OF BEHAVIORAL, PSYCHOLOGICAL AND COGNITIVE SERVICES

Senator Stennis. With the thanks of the committee I now call the next witness, Dr. Cynthia H. Null, executive director, Federation of Behavioral, Psychological and Cognitive Services.

All right, Doctor, we are glad to have you here. You are serving a high purpose, I'm sure.

Dr. Null. Good afternoon, Senator.

Senator Stennis. Please proceed.

Dr. Null. I am Dr. Cynthia H. Null, Senator.

Senator Stennis. Put that mike a little closer to you, please.

Dr. Null. I am executive director, Federation of Behavioral, Psychological and Cognitive Services.

This is a coalition of 13 scientific societies with combined memberships of over 90,000.

Thank you for the opportunity to comment on the fiscal year 1987 appropriations for the National Science Foundation.

As scientists, we are pleased with the administration's active support of federally funded basic research as is reflected in the proposed NSF 1987 budget.

In fact, consistent funding for NSF, whose sole mission is to support basic science, now is more important than ever, Mr. Chairman.

BEHAVIORAL AND COGNITIVE RESEARCH

As you are aware, NSF is an important source of funding for behavioral and cognitive research.

Research results cannot be bought on the short time scale. Collecting basic research this year means fewer gains in the subsequent years. We will not be able to remedy this deficit by increasing research spending at a later time. Good research requires attracting good people to work on important problems, training new researchers, obtaining basic results, and working out their applications. None of these can be done quickly, Mr. Chairman.

The investment in ideas, methods, and applications must be done now. That's why it is important for the Government to maintain and, whenever possible, enhance its support for basic research.

PRODUCTIVITY OF THE MIND

The human mind is really our biggest economic resource. The prospects of increasing human productivity lie in improving the productivity of the mind.

Now one way is by using technology to augment the human mind. Another is through research on the cognitive processes, which has the potential of enhancing our own abilities to think and solve problems and to approve education and training.

The Nation faces serious difficulties in adjusting to new information technologies in the work place and in finding productive ways to utilize new technologies to increase the productivity of our industrial and educational institutions which is important.

Automation increases productivity, but this also affects the role of the supervisor in an automated system. There is the airline pilot, the powerplant control room operators, or the intensive care nurse.

Now these jobs can quickly shift from boring when everything is going all right and when the computer is in control to overwhelming or even terrifying during an emergency.

Technology assists in performance and raises a whole new set of issues. Should computer systems make their own decisions? Should they inform the operator of every action that they take? Do these systems create or eliminate workload?

Much of the basic research that will help to answer these questions is in the area of decisionmaking, problem solving, perception, and motor skills.

Behavioral and cognitive science research results are already being used in the design of new human machine systems, development of training and educational programs, and the improvement of the working environment for many of our Nation's work force.

We wish to commend the leadership of this subcommittee which it has taken in science education. The need at this time for strengthening our Nation's educational programs in mathematics, science, and technology is broadly recognized.

This March the National Science Board report on undergraduate science, math, and engineering education cited serious deficiencies that are harming our country's economic, that is our economy and security.

Now to eliminate these deficiencies we need to improve our understanding of the process of problem solving, comprehension, learning, teaching, and testing to guide the development of new educational resources, including the effective use of new computational technology in both instruction and in testing.

It is clear that effective science education will result only from the efforts of both the science and educational communities.

We support interdisciplinary research efforts by behavioral and cognitive scientists, content area scientists and science educators.

We have so far learned that research in teaching and in learning in science, that this will be most effective if it is done in the context of the science that is being taught, Mr. Chairman.

Recent information about the sources of difficulty in understanding mathematical, scientific, and technical concepts provides the basis for the development of educational materials and methods for reaching a broad group of students, to increase the participation in mathematics and science courses of women and of members of minority groups.

We know that you face difficult budget decisions in the days ahead. But we would caution you not to deplete the mind of knowledge that's needed to keep this Nation strong. It would indeed be short-sighted to create an excess of additional such deficits for the next generation while attempting to solve the budget deficit. Let us not leave our children a deficit of basic research and a deficit in education training, a deficit in science, a deficit in knowledge, a deficit of productive ways to utilize new technology, or a deficit of effective training, teaching methods and curricular especially in science education.

We recommend that you continue to support the fundamental research, science research, by funding NSF at the level of the administration's fiscal year 1987 budget. This is the minimal amount necessary if the United States is to remain a world leader and innovator to ensure building on our previous investments.

We appreciate the subcommittee's major role in the recovery of behavioral funding in NSF. We do continue to need your support. Please do not hesitate to call on the federation if we can be of further assistance during your deliberations.

Thank you, Senator.

Senator STENNIS. Thank you. I am certainly aware that your paper has a lot of valuable information and suggestions and observations.

Dr. NULL. Thank you.

Senator STENNIS. It is valuable for one reason in that we can rely on what you have said.

Dr. NULL. Thank you.

Senator STENNIS. It is a highly competent source as well as to dependability.

I wish that more could have heard you, but this is being put in part of an important record. This will be available for the public generally throughout the country.

Dr. NULL. Yes.

Senator STENNIS. This will be used more than you might think.

If you have anything that you might want to add to it that you can think of before you leave we have the record open here.

Dr. NULL. Nothing, sir.

Senator STENNIS. We will have the record open as long as the hearing lasts today if you have any additional thoughts you might have.

Dr. NULL. Thank you very much.

Senator STENNIS. All right, again, with the thanks of the committee, we want you to come back here later, Dr. Null. Thank you.

Dr. NULL. Thank you.

[The statement follows:]

STATEMENT OF CYNTHIA H. NULL, PH.D., EXECUTIVE DIRECTOR, FEDERATION OF BEHAVIORAL, PSYCHOLOGICAL AND COGNITIVE SCIENCES

Mr. Chairman and members of the Subcommittee, I am Dr. Cynthia H. Null, Executive Director of the Federation of Behavioral, Psychological and Cognitive Sciences. The Federation, established in 1980, is a coalition of 13 scientific societies with combined memberships of over 90,000. The Federation's interests include research on behavioral, psychological and cognitive processes and their physiological bases and its application to education, health and human development. Thank you for the opportunity to comment on the FY87 appropriation for the National Science Foundation (NSF).

As scientists we are pleased with the Administration's active support of Federally funded basic research, as reflected in the proposed NSF FY87 budget. It is important to the nation to maintain a strong Federal role in basic research even as the Congress is making major steps to reduce the Federal deficit. In fact, consistent funding for NSF, whose sole mission is to support basic science, now is more important than ever.

Research results cannot be bought on a short time scale. Neglecting basic research this year means fewer gains in subsequent years. We will not be able to remedy this deficit by increasing research spending at that later time. Good research requires attracting good people to work on important problems, training new researchers, obtaining basic results and working out their applications. None of this can be done quickly; the investment in ideas, methods and applications must be made now. That is why it is important for the government to maintain and enhance, wherever possible, its support for basic research.

In this testimony we would like to call to the Subcommittee's attention the critical importance of research in the behavioral and cognitive sciences and science education.

Behavioral and Cognitive Sciences

The human mind is really our biggest economic resource. The prospects of increasing human productivity lie in improving the productivity of the human mind. One way is by using technology to augment human thinking. Another is through research on cognitive processes, which has the potential of enhancing our own abilities to think and solve problems and to improve education and training.

The nation faces serious difficulties in adjusting to new information technologies in the work place and in finding productive ways to utilize new technologies to increase the productivity of our industrial and educational institutions. Results of research in behavioral and cognitive sciences are already being used in the design of new human-machine systems, the development of programs of training and education and the improvement of the working environment for many in our nation's work force.

Traditionally one thinks of automation in terms of job productivity and job availability. However, automation affects the role of the supervisor of complex equipment and systems. Examples are airline pilots, power plant control room operators or intensive care nurses. These jobs can shift from boring (when everything is running smoothly under computer control) to overwhelming (during an emergency) in brief periods of time. Technology assists in performance, but it raises a new set of issues: Should systems make their own decisions? Should they inform the operator of every action they take? Do these systems create or eliminate workload? Much of the basic research that will help answer these questions is in the areas of decision making, problem solving, perception and motor skills.

Continued improvement in the use and development of technology requires solutions of fundamental scientific problems regarding the nature of human understanding, learning and motivation. We need to understand more about the cognitive skills and knowledge required for successful performance in technical domains. We need to study how people understand technological systems in order to assure an optional design for human use and comprehension. As we become increasingly dependent on electronic graphics for communication, scientific progress in understanding thought processes will contribute critically to the design of computer-based visual displays. Characterizations of the mental models that people use in reasoning provide a basis for better design of technical information systems and training in the use of technical systems.

In addition, recent basic research on visual perception and attention and spatial orientation is now changing, for example, our understanding of nighttime driving. These results have implications for driver education, night driving speeds, and headlight and highway lighting requirements. How do people rapidly identify the meaning of a visual symbol? Perhaps more interesting, why is it that people who have large vocabularies are quicker at recognizing simple words? What sort of information retrieval system gets better as its data base increases? Substantial advances in our understanding of word recognition are made by exploring computational parallels of the process. An area of increasing importance is psychobiology, an area which links research in brain processes with our understanding of behavior. Fundamental insights into the biological basis of memory, for example, can be expected in the coming years.

Science Education

The need for strengthening our nation's educational programs in mathematics, science and technology is broadly recognized. The March 1986 National Science Board report on undergraduate science, math and engineering education cites "serious deficiencies" that are harming this country's economy and security. In turn, this means that we need to improve our understanding of the processes of problem solving, comprehension, learning, teaching and testing to guide the development of new educational resources, including the effective use of new computational technology in both instruction and testing.

It is clear that effective science education will result only from the efforts of both the science and education communities. We support interdisciplinary research efforts by behavioral and cognitive scientists, content area scientists and science educators.

Research on problem solving has provided significant new information about cognitive processes and knowledge--demonstrating the kinds of knowledge required for successful problem solving and providing explicit descriptions of knowledge relevant to selected domains in science and mathematics. For example, a predominant view underlying current curriculum design and teaching in science is that students' understanding of scientific concepts is shaped by their instruction. Much care is taken to avoid presenting incorrect principles or concepts. However, students begin their study with strongly held conceptions of phenomena that are explained by scientific principles. Even young children are curious about their world--how things work as well as their classification. When children do not receive much formal science education until high school or college, misconceptions of scientific concepts are allowed to develop. Research shows that their preconceptions are often inconsistent with the principles to be learned but persist even after considerable instruction. As a consequence, students may be able to use their formal knowledge to correctly solve textbook problems but still base their understanding of events of the world on their incorrect preconceptions when taught with commonly used methods.

Many of the research findings are important for educational practice. Recent information about the sources of difficulty in understanding mathematical, scientific and technical concepts provides a basis for development of educational materials and methods for reaching a broader group of students. Research to identify factors contributing to relatively low levels of participation in mathematics and science courses by women and members of minority groups is underway and is suggesting ways in which increased participation can be developed.

Research in cognitive science is not only changing our views of how people learn science and mathematics, it is also shaping a theory of learning in which content plays a central role. The approach implies that much of the research in teaching and learning in science will be done in the context of the science being taught.

As with any science, research relevant to education in mathematics, science and technology is cumulative. It requires continuing support if it is to sustain and expand its impact in education. Continued NSF support is therefore critical.

Conclusion

We know that you face difficult budget decisions in the days ahead, but we would caution you not to deplete the mine of knowledge needed to keep this nation strong. As the President recently said in his report to Congress on our international science activities, "National leaders and the general public see science and technology as a key to the solution of a wide variety of national and international problems...Our international science efforts underscore our commitment to maintaining the United States as a world leader in scientific and technological excellence for peaceful purposes and for the benefit of mankind."

We recommend that you continue to support fundamental science research by funding NSF at the level of the Administration's FY87 budget. This is the minimal amount necessary if the United States is to remain a world leader and innovator and to insure building on your previous investment.

We appreciate the Subcommittee's major role in the recovery of behavioral and social science funding at NSF. Please do not hesitate to call on the Federation staff if we can be of further assistance during your deliberations. Thank you again for the opportunity to share our views with you and this Subcommittee.

STATEMENT OF ALAN G. KRAUT, ASSOCIATE EXECUTIVE DIRECTOR, AMERICAN PSYCHOLOGICAL ASSOCIATION

Senator STENNIS. The next witness here on our list is Dr. Alan G. Kraut, associate executive director, American Psychological Association.

Dr. KRAUT. Thank you, Mr. Chairman.

Senator STENNIS. We are glad to have you here. You have come here well recommended. You know the subject. You know what you want to say. So you just proceed now in your own way, Doctor.

Dr. KRAUT. Thank you, sir.

I am, as you said, Alan Kraut, associate director, American Psychological Association.

On behalf of APA's more than 87,000 scientific researchers and health professionals, I greatly appreciate this opportunity to testify before you on the NSF appropriations.

Mr. Chairman, I have submitted a detailed written statement to the subcommittee.

Senator STENNIS. Yes.

STATEMENT SUMMARIZED

Dr. KRAUT. I will only briefly summarize this today. I ask that the whole of my testimony be included in the record when I finish.

Senator STENNIS. Without objection that will be ordered, sir.

Dr. KRAUT. APA strongly endorses the administration's overall research budget request for the National Science Foundation. We commend the President and the NSF director, Erich Bloch for proposing to increase research support of the foundation even in this time of the severe budget pressure, Mr. Chairman.

We are delighted that there is now widespread consensus that investing in basic scientific research will help improve our competitiveness abroad and this will strengthen our scientific base at home.

Let me emphasize that the behavioral and social sciences have an important role to play in the revitalization of our nation's economic and technological base.

My written statement contains specific examples of how behavioral science research on organizational structures and personnel policies can vastly increase the productivity of this nation's work force.

I am pleased to add that these statements on the important nature of the behavioral and social sciences come not only from behavioral and social science advocates.

For example, the American Association for the Advancement of Science, AAAS, in testimony on the NSF budget earlier this year emphasized the important role of the behavioral and social sciences in revitalizing this Nation's competitive position, Mr. Chairman.

AAAS observed, and I quote, "Even on such important topics as industrial productivity and innovation, research findings from the social and behavioral sciences frequently are of greater consequence than those from the physical sciences and engineering."

AAAS then went on to express its concern over the marginal attention given the behavioral and social sciences by both NSF and the Office of Management and Budget.

DECREASE IN BEHAVIORAL AND SOCIAL SCIENCES FUNDING

Despite this growing support in the scientific community and despite APA's general support of the President's NSF budget proposal, I must point out that the funding of the behavioral and social sciences at NSF has fallen from 6.1 percent of the NSF research budget in fiscal year 1980 to 4.1 percent in fiscal year 1985 to 4 percent proposed by the administration for fiscal year 1987.

In fact, when adjusted for inflation, NSF funding for the behavioral and social sciences is now more than 30 percent below the fiscal year 1980 level.

To help to restore the behavioral and social science programs to their formal levels of support at NSF, we urge this subcommittee and NSF to allocate 5 percent of the research and related activities budget to the behavioral and social sciences.

On to another subject. I would like to express APA's strong support for the science and engineering education programs at NSF. We share the concerns expressed by the Congress and this subcommittee many times that improvement is needed in our Nation's science education activities.

We note that the administration has proposed increasing science education by $2 million. This is a step in the right direction. But we believe that larger strides are called for.

The long-term gains of basic scientific research clearly will not be realized if the scientists and engineers of tomorrow are not adequately prepared today.

On one additional issue, I would like to take this opportunity to commend you and the members of this subcommittee and NSF director Bloch for preserving support of research on the topic of ethics and values in science technology. We are also especially pleased that NSF plans to provide for the review of all projects in this area by an ethics advisory committee, Mr. Chairman.

It is essential for NSF to ensure that these studies be of high quality and properly coordinated.

Finally, I would like to thank the members of this subcommittee for their historically strong support of the research and related activities budget at NSF. We are hopeful that your deliberations will again demonstrate strong support for the National Science Foundation and specifically for behavioral and social sciences.

Thank you, Mr. Chairman.

Senator STENNIS. Thank you very much, Doctor.

You have some worthy things here. I recognize some of the facts that you referred to that I have run into.

Dr. KRAUT. Yes, sir.

Senator STENNIS. I have had the privilege of being on this subcommittee for a good number of years. I have gone to the operating table where I got the benefit of some of the science that has been testified to at these tables here and incorporated into a bill whose effectiveness has found its way into the surgeons' rooms.

You have some valuable matters here. You have a good reputation to live up to.

Dr. KRAUT. Thank you very much, sir.

Senator STENNIS. We thank you on behalf of all of our members.

Dr. KRAUT. Yes, sir.

[The statement follows:]

STATEMENT OF ALAN G. KRAUT, PH.D., ASSOCIATE EXECUTIVE DIRECTOR, AMERICAN PSYCHOLOGICAL ASSOCIATION, ON BEHALF OF THE AMERICAN PSYCHOLOGICAL ASSOCIATION

Mr. Chairman and Members of the Committee, I am Dr. Alan G. Kraut, Associate Executive Director of the American Psychological Association (APA). Thank you for this opportunity to submit our views on the Appropriations for the National Science Foundation for Fiscal Year 1987. APA represents the concerns of more than 87,000 psychologists, many of whom conduct important research with the support of NSF.

In this statement I will address specific areas of the proposed Fiscal Year 1987 NSF appropriations of interest to behavioral and social scientists. I will then comment at some greater length on an area of great concern to this Committee, the Administration and concerned Americans: the revitalization of this nation's economic and technological base.

NSF FISCAL YEAR 1987 APPROPRIATIONS

APA appreciates this opportunity to strongly endorse the Administration's proposed Fiscal Year 1987 research budget of $1.479 billion for the National Science Foundation. We commend the President and NSF Director Erich Bloch for proposing that NSF's total appropriations be raised to $1.7 billion even in this time of the most urgent fiscal austerity. These increases have been proposed by the Administration because of its conviction that investing in basic scientific research will improve our competitiveness abroad and our scientific base at home. APA is in agreement with that assessment of the importance of basic scientific research and strongly supports the President's Fiscal 1987 budget request for NSF. We commend the Administration for proposing to increase funding for the Biological, Behavioral and Social Sciences (BBS) Directorate by 12.4 percent over projected Fiscal Year 1986 funding levels.

Increases of this magnitude are needed to restore vigor to behavioral and social science research programs at NSF; these programs are still lagging far behind historical levels of support. It is significant that support of behavioral and social science research has fallen from 6.1 percent of NSF's research budget in Fiscal Year 1980, to 4.1 percent in Fiscal Year 1985, and to 4.0 percent proposed for Fiscal Year 1987. Between Fiscal Years 1980 and 1987, in fact, NSF support for the behavioral and social sciences has actually decreased when measured in constant dollars.

This pattern of decreased funding has acutally escalated in this Fiscal Year. For example, actual Fiscal Year 1985 funding of behavioral and social science programs in NSF's Behavioral and Neural Sciences (BNS) Directorate was $24.3 million. In Fiscal Year 1986, funding for these same programs was decreased to $22.8 million -- $2.5 million or 10 percent below the Fiscal Year 1985 levels. Gramm-Rudman-Hollings reductions account for 4.3 percent of that reduction. The greatest part of this cut, though, is attributable to NSF management decisions that shifted Fiscal Year 1985 funds appropriated for use within BNS to other programs. We are concerned that the NSF not disproportionately cut funding for behavioral and social science programs in Fiscal Year 1987, as it did in Fiscal Year 1986.

Behavioral science research within BNS and individual, investigator-initiated research within the Social and Economic Sciences (SES) divisions at NSF have been the disciplines that have fared the worst within the Foundation between Fiscal Years 1980 and 1986. According to an NSF analysis, projected support for these sciences in Fiscal Year 1986, when adjusted for inflation, is more than 30 percent below the Fiscal Year 1980 levels. In Fiscal Year 1986 funding for the entire BBS Directorate is projected at $247.5 million, some $6 million and 2 percent below Fiscal Year 1985 levels. As I have already pointed out, behavioral and social science programs within BBS are seeing budget reductions of 10 percent and more below Fiscal Year 1985.

To help restore the behavioral and social sciences to their 1980 levels of support at NSF in real inflation-adjusted dollars, we urge the Committee to approve the Administration's budget request for NSF and to direct NSF to allocate at least 5 percent of the Fiscal Year 1987 Research and Related Activities budget on behavioral and social science research programs. It is important to note that this increased level of funding would still fall more than 1 percent below the proportion of research support granted to the behavioral and social sciences at NSF in Fiscal Year 1980.

SCIENCE AND ENGINEERING EDUCATION

APA urges the Committee to reiterate its support for the strengthening of science education activities at NSF. We share concerns expressed by Congress and this Subcommittee many times that improvement is needed in our nation's science education activities. For Fiscal Year 1987 the Administration has proposed that $89 million be authorized for the Science and Engineering Education (SEE) directorate at NSF. We are hopeful that this increase of $2 million or 2.3 percent over Fiscal Year 1986 levels of support is but the first step to adequately fund science education activities at the Foundation. We also note with pleasure that NSF has repeatedly assured Congress that none of the funds appropriated to the program in either Fiscal Years 1986 or 1987 will be deferred into future fiscal years, as was the case between 1983 and 1985. But these comparatively small increases are not enough -- increased support for science education activities at NSF must be continued in the future. The long-term gains of basic scientific research clearly will not be realized if the scientists and engineers of tomorrow are not adequately prepared today.

ETHICAL RESEARCH ON SCIENCE AND TECHNOLOGY

APA would like to take this opportunity to commend the Members of this Subcommittee and NSF Director Erich Bloch for actions taken to preserve long-term support of research on the ethical questions often raised by scientific advances. APA encourages NSF to continue its new mode of distributed funding for ethics and values research, and suggests that funding for these activities be raised from $500,000 in Fiscal Year 1986 to $1 million in Fiscal Year 1987 (the activity's level of support between Fiscal Years 1975 and 1985). APA is particularly pleased that the Foundation is providing for the review of all projects in this area by an ethics advisory committee. It is essential for NSF to ensure that these studies be properly coordinated and of high quality. As new mechanisms are being created to support these studies, APA encourages Congress to continue overseeing NSF support of research activities on scientific ethics and values.

BASIC RESEARCH AS AN INVESTMENT

The Administration has proposed significant increases for NSF-supported research -- even in the face of large federal deficits -- with the conviction that investing in basic scientific research will improve our competitiveness internationally and strengthen our scientific base at home. At least eight major studies released in the last three years recommend strong support for basic research. Groups recommending increased Federal support for basic research (which is less likely to attract support from the private sector than applied studies) include such diverse groups as the Heritage Foundation, the National Association of Manufacturers, the AFL-CIO, the Business Roundtable, and Georgetown University's Center for Strategic and International Studies.

The behavioral and social sciences have a critical role to play in these efforts to revitalize the nation's economic and technological base. While our international competitors have been quick to recognize these contributions, increases in productivity that could be realized by modifying organizational structures and personnel policies have too often been passed over here in the United States. Indeed, the American Association for the Advancement of Science (AAAS), in Congressional testimony presented earlier this year, emphasized that in areas such as industrial productivity and innovation, "research findings from the behavioral and social sciences frequently are of greater consequence than those from the physical sciences and engineering."

While technological advances must figure prominently in revitalizing this nation's industrial base, human, social and institutional factors can play an even more important role. This is true whether one is addressing the conduct and management of research, the dissemination and marketing of new technical products, or the implementation of new manufacturing processes. A few examples follow:

1) Employee turnover is a costly problem in both the public and private sectors. Even when effects on the productivity of the organization have been disregarded, behavioral scientists estimate that it will cost between $400 and $4,700 (depending on the nature of the position and the organization) to replace each departing employee. A major study of 20 different experiments designed to reduce employee turnover (McEvoy and Cascio, Journal of Applied Psychology, 1985, Vol. 70, No. 2, 342-353) found that programs aimed at "enriching" jobs on average reduced employee turnover by 17 percent. Thus for every 100 employees that an organization has in a particular job category, enriching or redesigning job tasks could save an average company between $6,800 and $79,900 per year.

2) A global study on the impact of organized programs designed to increase employee productivity in the workplace found that the average worker's productivity did, in fact, increase significantly (Guzzo, Jette and Katzell, Personnel Psychology, 1985, Sum. Vol., 38(2), 275-291). This study analyzed the findings of 100 separate studies covering 11 types of psychologically-based organizational interventions. Not all interventions were equally effective. The most powerful strategies, it was found, were in the areas of employee training and goal setting. Suprisingly, supplying employees with increased financial incentives did not reliably lead to increased productivity. The effects of worker incentive programs varied widely the study found, sounding a warning to those who depend solely on increasing compensation to boost productivity.

3) Research conducted in the United States following the second world war demonstrated techniques to increase the quality of mass produced units through increasing employee decisionmaking (Coch and French, 1948, American Psychologist, 1982, Vol. 37, No. 7, 737-746). This social technology led to the training of production workers in rudimentary research design and

statistical techniques enabling them to monitor and become more involved in the production process. This concept, which was originated in the United States, evolved into the unique Japanese technology, "quality control circles." The high overall quality of the Japanese automobile industry is attributable in part to the effects of quality control circles.

While there is a great need to conduct more research on the development of strategies and conditions critical to more efficiently utilizing the nation's human resources, such studies, for the most part, are not supported at the National Science Foundation. Primarily, NSF funding for the behavioral and social sciences has gone to support important basic research by individual investigators pursuing the fundamental questions on human behavior and mental functioning. This is the type of work which forms the base for studies on improving productivity such as those already cited in this testimony. For example, social psychology research projects at NSF last year included basic studies on group opinion changes, social perception and the processing of social information. Findings emerging from these studies may be used to guide other behavioral scientists in devising strategies to be used in motivating employees to increase productivity. Similarly, basic research in the cognitive sciences last year included fundamental studies on knowledge acquisition, decision-making, and memory. Clearly advances in these areas are key to developing new, more effective educational and training strategies.

It is in the support of such basic, fundamental research in which NSF has the greatest role to play. Simply put, without the provision of additional financial inducements, support for these studies is rarely available from the private-sector since the ultimate payoff for these basic studies is often not readily apparent. Currently, behavioral and social science research is specifically excluded from the law which grants tax credits to industry in return for their support of basic scientific research.

Thank you again for the opportunity to present this statement. It has focused on the contributions that the behavioral and social sciences make to increasing the nation's productivity and international competitiveness. Of course, psychologists engage in many other areas of research. Their activities form an impressive array of inquiry which ranges from purely physiological phenomena to purely social phenomena and includes such diverse topics as normal and abnormal brain growth and development; educational processes such as learning and memory; the study of social institutions and interactions; survey research; and the development of standardized tests with many applications in both the public and private sectors.

Finally, we would like to thank this Subcommittee for its historically strong support of the Research and Related budget at the NSF. The Subcommittee's task is more difficult in this year of fiscal austerity, but therefore, all the more critical. Based on this Subcommittee's sensitivity to the contributions of the basic sciences, both at home and abroad, we are hopeful your deliberations will again demonstrate strong support for the NSF and the programs funded by the agency.

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

STATEMENT OF REVEREND J.W. CARROLL, EXECUTIVE DIRECTOR, UNITED METHODIST SENIOR SERVICES OF MISSISSIPPI

Senator STENNIS. All right. Our next witness is the Reverend J.W. Carroll, executive director of the United Methodist Senior Services of Mississippi. He is appearing on behalf of the American Association of Homes for the Aging.

I have the privilege of being from the same State that you are from, Reverend Carroll. I will give you a special welcome here today. I will be glad to hear your testimony today, Reverend.

Reverend CARROLL. Thank you, sir.

I have a prepared oral statement. Along with the American Association of Homes for the Aging I would like to request this written testimony be submitted or placed in the record.

Senator STENNIS. Yes. Without objection, it is ordered to be placed in the record when you complete your oral remarks, Reverend.

Reverend CARROLL. Thank you, Mr. Chairman.

COMMUNITY SERVICES TO THE ELDERLY

My name is Bill Carroll. I'm the executive director of the United Methodist Senior Services of Mississippi. It is an organization which, for over 25 years, has offered a broad range of community services to the elderly. It now serves daily more than 2,500 older persons in Mississippi, including the operation of 11 health care and housing facilities which, themselves, provide services to more than 900 older persons.

I am testifying today on behalf of the American Association of Homes for the Aging, or AAHA, where I currently serve as a member of its house of delegates and its housing policy committee.

AAHA is the national representative of nonprofit faciliities providing housing, health care, and other supportive type services to older Americans.

Mr. Chairman, I believe that certain current demographic projections provide striking evidence of the pressing need for housing which is especially designed to meet the needs of older persons.

In the past three decades, the number of Americans over 65 has doubled. It will double again by the year 2030. At that time, one out of every five Americans will be over 65. There will be individuals 85 years and older, a group that will require high levels of support, which will increase sixfold by the year 2030.

Now to keep pace with this demand for the elderly, the University of Michigan has estimated that at least 275,000 new housing units need to be constructed each year through all sources until the end of this century.

In Mississippi, our experience indicates an immediate need in our State for over 2,500 units of low-income elderly-type housing similar to what the United Methodist Senior Services of Mississippi currently provides.

Finding affordable housing is extremely difficult for the numerous older Americans whose incomes fall below the Federal poverty guidelines. Three and a half million elderly households have annual incomes of less than $5,000. However, only one out of seven receive some form of governmental housing assistance.

HUD has determined that nearly one in five elderly households lives in inadequate housing due either to substandard conditions or rent payments which, in many cases, exceed 50 percent of their personal income.

The private housing market has not kept pace with this demand, particularly housing designed for the physically impaired and low income elderly.

Federal programs have been the major vehicle for meeting these specialized housing needs of the older Americans.

HOUSING FOR THE ELDERLY AND HANDICAPPED

Section 202, housing for the elderly and for the handicapped, particularly, has been extremely successful. Mr. Chairman, nationally the program has experienced only 1 default in over 2,000 projects. That ought to be repeated. The program has experienced only 1 default in over 2,000 projects.

In Mississippi, our organization has had a long and had a productive 20-year partnership with the Federal Government in serving the housing needs of the elderly people in Mississippi and of their housing needs through section 202 and the other HUD programs.

We still see a pressing need for the type of housing that is offered by the Section 202 program.

The United Methodist Senior Services has facilities with waiting lists of over 300 persons. People are having to wait on an average of 3 to 5 years.

The Senate Select Committee on Aging in 1983—that is, in the 1983 national survey on Section 202 projects—it estimated that over a quarter of a million elderly were on the facility waiting list.

Despite the success of section 202 and other HUD programs in providing decent and affordable units for elderly residents and in contrast to the rising needs projected for the future, Federal housing assistance for low-income for the elderly has been radically cut in recent years.

ACTIONS RECOMMENDED

Therefore, AAHA urges that the following actions be taken with regard to fiscal year 1987 assisted housing funding.

Congress should provide level funding for the fiscal year 1987 HUD-assisted housing programs with an adjustment for inflation.

Specifically, AAHA recommends that this subcommittee should continue to provide full funding for Section 202 housing for the elderly and handicapped.

Congress should fund the Housing Services Program at a level—that is, the Congregate Housing Services Program—at a level of $10 million enabling nonprofit sponsors to continue to expand the provision of supportive services, such as meals and housekeeping and transportation. All of this is necessary for the frail elderly to retain independent lifestyles and to avoid premature institutionalization.

This program continues to demonstrate its ability to keep people out of nursing homes.

This subcommittee should freeze the voucher program at its current unit level to prevent attempts to administratively shift funds from other needed housing assistance programs which have more effectively assisted older Americans. The subcommittee should provide modernization of funding equal to $1.5 billion in budget authority to provide the critically needed repairs and improvements essential to the preservation of the continued improvement of the Nation's stock of public housing.

In several other areas of concern to the association we urge that the congress should also take swift action to overturn the administration's deferral proposals for the 1986 HUD-assisted housing program so that programs such as 202 may proceed as Congress intended.

In legislation, Congress should specify that the interest rate for section 202 be set at 9¼ percent, as has been done in the past several years so that continued participation by nonprofit sponsors remains financially feasible.

In addition, Mr. Chairman, the subcommittee may wish to consider reducing the cap on the interest rate to reflect the recent declines in the average Treasury borrowing rate below the 9¼-percent level.

Finally, an issue with which I am personally concerned is this. This subcommittee should include statutory language in the fiscal year 1987 HUD appropriations legislation that is designed to ensure HUD's proper administration of the 1981 requirement that targets most HUD assistance to very low-income persons.

We are appreciative of this subcommittee's past efforts to clarify and resolve this issue. But HUD continues to impelement the targeting requirement in a manner which runs counter to the subcommittee's expressed intent. This threatens to undermine the financial viability of section 202 projects, Mr. Chairman. In rural areas such as Mississippi, the targeting requirement imposes an almost impossible burden on the nonprofit sponsors seeking to serve in the smaller communities.

In Starkville, MS, for instance, a 60-unit United Presbyterian church-sponsored facility that opened last June has only been able to serve seven elderly persons due to this targeting requirement. The rest of the units remain vacant. This is a situation which threatens both the project and the Presbytery with bankruptcy. This cost the Federal Government large sums of money. Most importantly it denies the needed assistance for Mississippi's elderly.

In conclusion, I thank you on behalf of AAHA and the United Methodist Senior Services of Mississippi for the opportunity to offer our views concerning the fiscal year 1987 funding for the housing programs.

Sir, I would now be happy to respond to any questions that you might have.

Senator STENNIS. All right. That was a fine statement that you made.

I have two questions that are written out here.

Reverend CARROLL. Yes.

Senator STENNIS. You have touched in part on one of them in particular. The time for now is just about consumed.

I wish that you would take these two written questions and put them into the record now, Mr. Reporter.

Reverend Carroll, please write out your answer when you see fit.

Reverend CARROLL. All right, sir.

Senator STENNIS. That will then be included in the record later.

Reverend CARROLL. Yes, sir; I will be glad to do so.

Senator STENNIS. Thank you very much. We appreciate very much your testimony. Nothing could be more important. I wish that we could make more headway. We appropriate the money here and try to express conditions and all under which it will be spent. It doesn't always come out that way. We will keep trying.

Reverend CARROLL. Yes, sir.

Senator STENNIS. We will keep trying and you keep trying, too.

Reverend CARROLL. Thank you, sir.

Senator STENNIS. Thank you very much.

[The statement follows:]

STATEMENT OF REV. J.W. CARROLL ON BEHALF OF THE AMERICAN ASSOCIATION OF HOMES FOR THE AGING

Mr. Chairman and members of the Subcommittee, I am Rev. J. W. Carroll, Executive Director of United Methodist Senior Services of Mississippi. I am testifying on behalf of the American Association of Homes for the Aging (AAHA), where I currently serve as a member of the House of Delegates and the Housing Policy Committee.

On behalf of the Association, I wish to thank the Subcommittee for the opportunity to testify regarding appropriations for the Department of Housing and Urban Development (HUD) for the fiscal year 1987 budget. The Subcommittee on HUD-Independent Agencies plays a key role in keeping the issue of housing needs of older Americans before the Congress and has advocated providing adequate funding to ensure older Americans the availability of decent, affordable housing.

Housing is an issue of critical importance to AAHA's membership. AAHA represents over 2,800 nonprofit organizations providing housing and health-related services for approximately a half million elderly individuals throughout the United States. Over 75 percent of AAHA member homes are affiliated with religious organizations, while the remaining are sponsored by private foundations, government agencies, unions, fraternal organizations and community groups. More than half of AAHA's members operate some form of residential facility for the elderly; many receive assistance from HUD under various housing programs, including Section 202, Section 8, Section 236, Section 231, and Section 221(d)(3).

THE NEED FOR ELDERLY HOUSING

AAHA urges Congress to continue its recognition of the tremendous need for housing assistance by our nation's rapidly growing elderly population. The number of older Americans has doubled in the past three decades, reaching a current level of 26 million people. This explosive growth is expected to continue well into the next century, with one out of every five Americans being over age 65 by the year 2030. These national figures mask the true extent of need for elderly housing programs. The very old (those 85 years and older), a group with special needs who require high levels of support, will increase threefold by the end of this century. Driven by the aging of the "baby boom" generation, this very old population will triple by 2030, with the result that five percent of the American population—16 million people--will be 85 years or older.

Older Americans have been overrepresented in the lower range of national distribution of income. Although recent Administration reports have portrayed the elderly as achieving income parity with the general population, aggregate national figures again understate the extent of poverty and need. Three-and- a-half-million elderly households have annual incomes of less than $5,000; but only one out of seven receives some form of governmental housing assistance. The fastest growing subgroups of elderly persons are women, the very old, and persons living alone; groups which, coincidentally, are among those with the highest poverty rates. For example, elderly black women living alone are more than four times as likely as the overall elderly population to fall below federal poverty guidelines.

While over 14 percent of all elderly persons live on incomes below the poverty level, an equally large percentage hover just above this standard. These "near poor" older Americans also experience difficulty in obtaining decent and affordable housing. HUD itself has determined that nearly one in five elderly households live in inadequate housing due either to substandard conditions or rent payments in excess of 50 percent of income.

Elderly housing assistance has figured prominently in the federal government's 50-year commitment to assure decent and affordable housing for disadvantaged Americans. Our nation's private housing market has not kept pace with the demand for lower-cost housing, particularly housing with special design features to serve the physically impaired or elderly. Federal programs have been the major vehicle for meeting the specialized housing needs of older Americans. This need was estimated in a recent University of Michigan study at an additional 275,000 new units per year through the end of this century.

While many elderly poor are already assisted by federal housing programs, unfortunately the limited scale of programs such as Section 202 housing for the elderly and handicapped has meant only a small segment this population has been served. Only a half million elderly households receive housing assistance under federal programs. Typical waiting lists for assisted housing run three to five years. In New York City alone, there are 20,000 elderly pesons on public housing waiting lists.

FISCAL YEAR 1987 HUD FUNDING

Massive cutbacks in housing assistance over the past few years have seriously eroded the ability of federal housing programs to serve the elderly poor. The current pressure to meet Gramm-Rudman-Hollings deficit targets exacerbates this trend. Major HUD programs that have provided new housing units for lower income elderly—public housing, Section 8 and Section 202—have reduced production to a negligible level: down from an average of 84,000 units per year between 1980-82 to roughly 11,500 units (after the March 1 Gramm-Rudman-Hollings sequestration) in 1986.

The Administration's fiscal year 1987 budget proposes to end all new housing assistance under HUD programs, in both fiscal years 1986 and 1987 and to substitute an unproven and inappropriate form of assistance—housing vouchers—for all programs providing assistance for new housing construction, housing rehabilitation and other housing assistance programs.

Given the clearly established need for these programs and the expected growth in the elderly population, AAHA opposes any attempt to eliminate funding for new assisted housing units. The demand for low-income elderly housing remains and will not simply disappear by terminating programs and replacing them with inadequate substitutes. Federal housing efforts should be continued and expanded.

Therefore, AAHA recommends that Congress freeze the overall number of new assisted housing units in fiscal year 1987 at the fiscal year 1986 level, and preserve the same unit mix as provided in the fiscal year 1986 appropriations. This action would preserve such critically needed programs as Section 8 existing and moderate rehabilitation, public housing operating subsidies, Indian housing, and Section 202 preconstruction and existing amendment funds.

Specifically, AAHA recommends the following:

- The Subcommittee should provide full funding for Section 202 housing for the elderly and handicapped. AAHA recommends that 12,000 units be authorized for fiscal year 1987. This level still falls short of the 1981 White House Conference on Aging's recommendation of 20,000 new units of Section 202 housing per year, but reflects an understanding of current budgetary constraints.

- The Subcommittee should fund the Congregate Housing Services Program at a level of $10 million to continue and expand the program so that nonprofit sponsors may continue to provide those additional services, such as meals, housekeeping and transportation, necessary to enable the frail elderly to avoid premature institutionalization. The program is designed to encourage handicapped elderly, non-elderly handicapped, and temporarily disabled individuals to remain in a home environment, thus avoiding the more costly alternative of institutionalization, often delivered and paid for by other federal programs such as Medicare or Medicaid.

- The Subcommittee should freeze the housing voucher program at its current unit level to prevent attempts by HUD to administratively shift funds from other needed housing assistance programs. The Administration seeks to further shift federal housing efforts to an exclusive reliance on housing vouchers for the delivery of housing assistance, proposing that vouchers represent 100 percent of all assisted housing units in fiscal year 1987. Because vouchers are a commitment of assistance of only five years, they do not promote needed rehabilitation and construction of housing units—activities critical in providing units designed for the safety and well-being of the elderly. Furthermore, vouchers are especially inappropriate for older Americans as they place the frail elderly in competition with younger, more mobile families.

- The Subcommittee should, as has been done in recent years, specify in legislation that the interest rate for Section 202 be set at 9.25 percent so that continued participation by nonprofit sponsors remain financially feasible. With the anticipated decline in the average interest rate on public debt instruments, the subcommittee may also wish to consider directing HUD to adjust the interest rate on Section 202 direct loans in fiscal year 1987 accordingly.

- The Subcommittee should provide modernization funding equal to $1.5 billion in budget authority (equivalent to $750 million in loan authority). The nation's public housing stock is a valuable investment in which close to half of the residents are elderly. Modernization funds provide critically needed repairs and improvements essential to the preservation and continued use of this resource.

FISCAL YEAR 1986 RESCISSIONS AND DEFERRALS

Congress last year soundly rejected the Administration's proposal to terminate virtually all housing assistance by freezing the overall number of new incremental housing units in the fiscal year 1986 appropriations for HUD. Rejection of this plan gave clear expression of support and recognition of a continued federal commitment to housing programs serving the nation's low-income population.

The President now seeks to take back funds already approved for assisted housing programs in this fiscal year. Specifically, the Administration has proposed a $4.4 billion rescission in the assisted housing account, which provides funding for many rental assistance programs such as Section 8 existing and moderate rehabilitation, public housing operating subsidies, and Section 202/8 rental assistance. Additionally, $2.3 billion in funds from the same account have been proposed for deferral until fiscal year 1987, as has $599 million in Treasury borrowing authority for the Section 202 loan program. The remaining funds for 1986, as well as money deferred until the next fiscal year, are proposed to be reprogrammed for use soley in the housing voucher program. Overall, the President seeks, in an unprecedented use of rescission and deferral power, to slash the number of HUD-assisted housing units by half. More importantly, if Administration proposals were to be adopted, funding for HUD housing, already reduced by two-thirds since 1980, would be further reduced by 70 percent in the current fiscal year.

While the rescission proposal has expired and no reprogramming of housing funds has yet been approved, the deferrals proposed by the President have not been formally rejected by Congress. Until this occurs, the Administration refuses to release most 1986 housing funds. AAHA is gravely concerned that, without timely action to overturn those deferral requests, the Administration's goal of terminating all HUD-assisted housing programs except vouchers will be achieved de facto—completely undermining Congressional prerogatives and priorities clearly established in fiscal year 1986 appropriations. Further delay in releasing housing funds may effectively preclude obligation by the end of the fiscal year, at which time those funds may lapse. The outlook for carrying forward any program funding which lapses is, at best, bleak considering the need for deficit reduction likely. Therefore, AAHA urges swift action to overturn the Administration's deferral proposals for HUD-assisted housing programs to help meet nation's low-income and elderly.

VERY LOW-INCOME OCCUPANCY REQUIREMENT

The 1981 Omnibus Budget Reconciliation Act added a new Section 16 to the Housing Act of 1937 that established a general priority for Section 8 assistance for persons with "very low-incomes" (defined as persons with less than 50 percent of area median income). HUD issued a final regulation in the May 10, 1984 Federal Register interpreting Section 16(b) to impose an absolute prohibition against admission of persons with incomes between 50-80 percent of area median income to any facility receiving Section 8 rental payments, including Section 202 facilities. HUD's policy limits new occupancy to such facilities by 100 percent very low-income persons unless HUD specifically grants an exception on a case-by-case basis. Even if fully justified and requested, HUD maintains that it is under no obligation to grant waivers. There is a clear discrepancy between HUD policy and Congressional intent establishing this national goal. Since the issuance of the regulation in 1984, AAHA has pursued legislative action to correct HUD's misinterpretation. Conference Report language accompanying the initial legislation made clear that HUD was to administer the 95 ercent requirement nationwide; not on a program-by-program or project-by-project basis. HUD's insistence on its rigid interpretation has led some to believe that legislation will offer the only realistic method to gain appropriate administration of this requirement.

The Chairman of this Subcommittee has proven extremely helpful in seeking to resolve this problem and has encouraged efforts to ensure HUD administer the targeting requirement in accordance with Congressional intent. Actions to date include:

- Senate Colloquy (June 24, 1984) - Senators Garn, Hatfield, and Packwood conducted a colloquy on the Senate floor during consideration of the FY85 HUD appropriations bill. The colloquy clearly established Congressional intent that HUD administer the targeting requirement on a flexible basis. In addition, HUD's retroactive application of the 100 percent very low-income requirement on projects approved on a different basis was criticized, and the expectation was established that HUD grant sufficient waivers to this special class to ensure their continued feasibility.

- Senate Fiscal Year 1986 Appropriations Committee Report (August 28, 1985) - The Senate Committee on Appropriations included language in its committee report on the HUD fiscal year 1986 appropriations bill which reiterated Congressional intent that the targeting requirement be administered on a nationwide and Departmentwide basis and that flexibility was especially needed in projects which had been approved on the basis of serving a broader income mix.

We are appreciative of Senate efforts to correct HUD's misapplication of the targeting requirement to Section 202 projects. Unfortunately, the experience of our members clearly indicate that HUD continues to ignore Congressional sentiment expressed in the colloquy and Committee Report language. The Association supports the goal of targeting assistance to those most in need, and believes that the national goal of 95 percent can be met. AAHA has developed a suggested alternative, which would meet the national goal of providing 95 percent of housing assistance to the very ow-income, while providing the needed flexibility to ensure feasibility of roject-based programs such as Section 202. Therefore, AAHA urges that this subcommittee include statutory language similar to the Association's alternative (which we will be happy to provide) in the fiscal year 1987 HUD appropriations legislation.

CONCLUSION

AAHA is gravely concerned with the continued erosion of federal housing efforts under this Administration. While we are sensitive to the need to reduce federal budget deficits, AAHA disagrees with the massive change in federal housing policy represented in the Administration's budget. The termination in assistance for new housing construction and renovation, together with complete reliance on housing vouchers, will undermine both public and private efforts to meet the growing housing needs of aging Americans. Moreover, reductions in public housing operating subsidies and modernization funds threaten to destroy public investment in our existing stock of public housing units.

In conclusion, AAHA strongly supports a continued federal commitment to involvement in providing housing for the elderly and urges an expansion of this involvement. Without broader housing choices, the elderly will continue to be forced into inadequate housing, or housed inappropriately in more costly nursing facilities. The federal government must continue to be an active partner with the nonprofit community and the broader private sector in providing affordable housing that is designed and managed with the unique needs of the elderly in mind.

NATIONAL SCIENCE FOUNDATION

STATEMENT OF MURRAY J. COHEN, MEDICAL RESEARCH MODERNIZATION COMMITTEE

Senator STENNIS. All right. Our next witness is Dr. Murray J. Cohen, a member of the Medical Research Modernization Committee appearing on behalf of Friends of Animals, Inc.

Dr. Cohen, we are glad to have you here.

Dr. COHEN. Thank you, Mr. Chairman.

Senator STENNIS. Doctor, please now proceed in your own way.

Dr. COHEN. Mr. Chairman and members of the subcommittee, thank you for the opportunity to testify before you today.

My name is Murray Cohen. I am an M.D. specializing in psychiatry. I am currently engaged in the private practice of psychiatry. I serve as the chief of the psychiatry outpatient department of a New York teaching hospital. Formerly I was the director of the narcotics rehabilitation center of another New York teaching hospital.

Finally, I'm a member of, and represent the Medical Research Modernization Committee, a group of approximately 800 health care professionals, including physicians, dentists, veterinarians, psychologists, nurses, social workers, researchers and other clinicians and Ph.D.'s of varying types, Mr. Chairman.

WASTE IN NATIONAL SCIENCE FOUNDATION

My purpose in testifying here today is to discuss fiscal year 1987 appropriations in support of the National Science Foundation and to try and convince you and the committee that much of the money appropriated to support this institution is being wasted.

According to fiscal year 1987 special analysis of the budget of the U.S. Government, obligations for research supported by NSF are expected to increase by about $174 million, or 13 percent to $1.5 billion.

Among other things, these funds provide enhanced support for basic research in academic institutions.

Mr. Erich Bloch, Director of NSF, testified before this subcommittee on March 5, 1986, that NSF provides about 25 percent of the Federal support for basic research at colleges and universities.

Now, he did point out that contrary to other countries, in the United States that about half of all basic research activity takes place in colleges and universities, resulting in the inexorable intertwining of higher education and research.

This system, I would like to suggest, is mistaken and misguided. I will further discuss this subsequently.

Daniel Greenberg, editor-publisher of Science and Government Report, states in the January 1986 edition of "Discover," that:

> In the world of scholarship, scientists retain ducal status. They've prospered under Federal policies that generously finance fundamental science, including biomedicine and chemistry. But with antideficit fervor running hot in national politics, these are perilous times for the rich and pampered programs in the Federal inventory.

Researchers are incubating the most colossal and expensive projects in its history, as well as hoping for billions of dollars to expand university laboratories. Academe is traditionally hungry for Federal money, but never more so than now.

Mr. Greenberg quotes Mr. Bloch as noting here the NSF budget has soared by $0.5 billion over the past 5 years requiring that difficult issues such as the definition of priorities and the delineation of areas to cut or reduce must be raised.

Mr. Bloch had previously told Science Magazine:

> I'm not convinced that everything we are doing across the Federal spectrum of research programs is worth keeping. You can't carry everything forever.

PSYCHOLOGY EXPERIMENTS

To illustrate Mr. Bloch's quote to reexamine priorities and to cut funds in certain areas as well as his questioning the worthiness or need to continue certain research projects, let us look at psychology experiments which study the animal behavior with results which may or may not be applied to human beings. If they are applied to human beings it is wrong-headed to do so. Animal models cannot possibly serve to elucidate complex human behavior.

If it is known that they cannot apply to human beings, the experiments should be eliminated. If cuts are needed, which they are in these times of reduced support for human treatment programs, then this pure animal research performed with the full knowledge of inapplicability to humans should not be funded by the taxpayers' money.

Psychology expriments using animal models in general are useless.

As has been said repeatedly by different men of science, the proper subject for the study of man is man. In a pathetic attempt to convert psychology, a social science, into a pure science, animal models, in which animals are regarded as being machines, are studied as if they were inanimate objects and results are sold to us as having implications for the better understanding and improvement of human health. This is scientific fraud.

To give you a concrete example of the above, only one of many which might be chosen, NSF grant BNS 80–08546 supportive psychology research which produced a paper in the 1982 edition of Behavioral and Neural Biology entitled "Factors Influencing Pregnancy-Induced Aggression in Mice." Mr. Chairman, I will quote:

> The general conclusion of the study was to further reinforce an older finding that pregnancy induces behavioral changes in mice that are manifested, in part, by elevated levels of male-directed agonistic behavior. In common English, pregnant mice are more aggressive toward male mice. Nowhere in the article, quite properly, is the suggestion that these findings have any bearing on human beings. What conceivable value is there, or what purpose served, to allocate dwindling funds for this kind of research which is typical in psychology experimentation.

This research paradigm, in 1982, was in existence for at least 10 years. Although I cannot say that each previous study was supported by NSA allocations, it is noteworthy to consider prior publications by the same senior researcher in all likelihood supported by Federal funds.

In 1973, "Postpartum Aggression in Mice—Experimental and Environmental Factors"; In 1975, "Postpartum Aggression in Mice—Inhibitory Effects of Estrogen"; In 1976, "Suckling Stimulation Induces Aggression in Female Mice"; In 1977, "Maternal Aggression in Mice Influence of the Young"; Then, in 1980, "Mice. Suckling Stimulation But Not Lactation Important for Maternal Aggression"; In 1982, "Maternal Aggression Exhibited by Hypophysectomized Parturient Mice."

Now previous Federal money is spend annually on this sort of animal experimentation which is of no value to the people whose health needs go unaddressed because of the gradual withdrawal of support to treatment providers. Does this situation reflect priorities in proper order?

To return to a previous point, the tradition of intertwining higher education and research that we have in this country explains both the waste of a tremendous amount of money as well as the policy of utilizing the criteria defining a good researcher to advance people up the academic ranks of pedagogery.

The characteristics of good researchers and teachers have little in common. Yet, most major academic centers have a research orientation. One reason, one major reason being, that, according to NSF, Federal research grants provide 70 percent of the total university and college expenditures. This structure causes people to be attracted to medical careers who regard medicine as more of a science than an art, which it is not. They are not sufficiently concerned with the reduction of human pain and suffering.

This also causes grantsmanship, the phenomenon of obtaining research grants at any cost and often without addressing a valid human health question or need in order to balance the university budget.

Now this, in turn, populates the faculty with an overabundance of researchers who do not serve as good role models, motivators, teachers, or molders of future physicians.

The publish or perish mentality which prevails destroys the atmosphere required to get a good education at any level, university, postgraduate or professional.

In closing, I would urge the committee to assess very carefully the advisability of expanding the NSF budget and to consider redirecting some of the funds toward the provision of basic health care for sick persons who could utilize the medical techniques based on research and knowledge already in existence.

Thank you, Mr. Chairman, very much.

Senator STENNIS. Well, we do want to thank you very much, too.

I realize the value of receiving and preserving information for the public and for use here in our own duties as well as use for all who may be interested and who may want to use this information.

You have used up your time. But if you have thought of some other matter that you want to add, you may do so for the record.

Dr. COHEN. Yes, sir.

Senator STENNIS. Do you want to offer that for the record now?

Dr. COHEN. I would like to make one additional point since you have graciously given me the time to do so.

Senator STENNIS. All right.

MISTREATMENT OF PRIMATES

Dr. COHEN. I would like to give a final example of waste of Federal funds. There is the $30,000 per year that the NIH is spending to house the 25 Silver Spring monkeys which were originally experimented on and badly mistreated by Dr. Edward Taub.

These primates are not currently part of a research protocol, but are cruelly being kept captive by NIH because of the pressure from the biomedical research community to further the entrenchment of the notion of animal experimentation.

These animals have suffered enough. The humane organizations will assume responsibility for these monkeys involved and to transfer them to a primate sanctuary in Texas.

In spite of reassurances from NIH that these pathetic monkeys would be transferred to the Institute for Behavioral Research—I am sorry. That they would be transferred to a humane organization, the Institute for Behavioral Research has prevented this transfer.

Congressmen Smith and Rose are desperately trying to facilitate the proper humane disposition of these animals as mriginally promised by circulating a letter that has already been signed by 120 Congressmen.

I beg the members of this subcommittee to aid them in their efforts and to work to protect previously abused primates who cannot speak for themselves.

Thank you, sir.

Senator STENNIS. Thank you, Doctor, again.

It may be that this testimony comes more under the jurisdiction of another subcommittee. We can check that out and pass it on to them.

Dr. COHEN. Thank you.

Senator STENNIS. Senator Weicker of Connecticut is the chairman of the other subcommittee.

We are most grateful to you for your testimony and for coming here.

Dr. COHEN. Yes, sir.

Senator STENNIS. I want to thank Mr. Martin Reiss, too, and those with him on the staff for their splendid preparation for this hearing. I have never seen one set forth better and more convenient. It seems to be moving along mighty well. The witnesses were specially selected, too, Mr. Reiss.

Thank you again, Doctor.

Dr. COHEN. Thank you, Mr. Chairman.

[The statement follows:]

STATEMENT OF MURRY J. COHEN, M.D., OF THE MEDICAL RESEARCH MODERNIZATION COMMITTEE

Senator Garn, members of the Subcommittee on HUD-Independent Agencies, thank you for the opportunity to testify before you today.

My name is Murry Cohen and I am an M.D. specializing in psychiatry. I am currently engaged in the private practice of psychiatry, and I serve as the chief of the psychiatry out-patient department of a New York City teaching hospital. Formerly I was the director of the Narcotics Rehabilitation Center of another New York City teaching hospital. Finally, I am a member of, and represent, the Medical Research Modernization Committee, a group of approximately 800 health care professionals, including physicians, dentists, veterinarians, psychologists, nurses, social workers, researchers, and other clinicians and Ph.D.'s of varying types.

My purpose in testifying today is to discuss FY87 appropriations in support of the National Science Foundation and to try and convince you that much of the money appropriated to support this institution is being wasted.

According to the FY87 Special Analyses of the Budget of the United States Government, obligations for research supported by NSF are expected to increase by about $174 million, or 13 percent, to $1.5 billion. Among other things, these funds provide enhanced support for basic research in academic institutions. Mr. Erich Block, Director of NSF, testified before this subcommittee on March 5, 1986 that NSF provides about 25% of the federal support for basic research at colleges and universities. He also pointed out that, contrary to other countries, in the U.S. about half of all basic research activity takes place in colleges and universities, resulting in the inexorable intertwining of higher education and research. This system, I would like to suggest, is mistaken and misguided. I will further discuss this subsequently.

Daniel Greenberg, editor-publisher of "Science and Government Report", states in the January 1986 edition of "Discover": "In the world of scholarship, scientists retain ducal status. They've prospered under federal policies that generously finance fundamental science", including biomedicine and chemistry. "But with anti-deficit fervor running hot in national politics, these are perilous times for the rich and pampered programs in the federal inventory. ....researchers are incubating the most colossal and expensive projects in its history, as well as hoping for billions of dollars" to expand university laboratories. "Academe is traditionally hungry for federal money, but never more so than now."

Mr. Greenberg quotes Mr. Bloch as noting that the NSF budget has soared by one-half billion dollars over the past five years, and as suggesting that difficult issues, such as the definition of priorities and the delineation of areas to cut or reduce, must be raised. Mr. Bloch, it should be noted, had previously told "Science" magazine: "I'm not convinced that everything we are doing across the federal spectrum (of research programs) is worth keeping. You can't carry everything forever."

As a case in point regarding Mr. Bloch's call to re-examine priorities and cut funds in certain areas, his questioning the worthiness of certain research projects, and his concern about the continuousness of some research, let us look at psychology experiments in which animal behavior is studied and the results applied to human behavior,or in which animal experiments are performed without any thought to generalize the results to humans. The former is wrongheaded, for animal models cannot possibly serve to elucidate complex human behavior, and the latter should be reprioritized on a much lower level of importance. If cuts are needed, which they are in these times of reduced support for human treatment programs, then this "pure" animal research, performed with full knowledge of its inapplicability to humans, should not be funded by the taxpayers money. Psychology experiments using animal models, in general, are useless. As has been said repeatedly by different men of science, the proper subject for the study of man is man. In a pathetic attempt to convert psychology - a social science - into a "pure" science, animal models, in which animals are regarded as machines, are studied as if they were inanimate objects, and the results are sold to us as having implications for the better understanding and improvement of human health. This is scientific fraud.

To give a concrete example of the above - one of many which might be chosen - NSF Grant BNS 80-08546 supported the research of Drs. Martha A. Mann and Bruce Svare, psychologists at the State University of New York at Albany, which produced a paper published in the 1982 edition of BEHAVIORAL AND NEURAL BIOLOGY entitled "Factors Influencing Pregnancy-Induced Aggression in Mice."(The general conclusion of the study was to further "reinforce" an older finding that "pregnancy induces behavioral changes in mice that are manifested, in part, by elevated levels of male-directed agonistic behavior.") In common English - pregnant mice are more aggressive toward male mice. Nowhere in the article, quite properly, is the suggestion made that these findings have any bearing on human beings.// //What conceivable value is there, or purpose served, to allocate dwindling funds for this kind of research - research which is typical in psychology experimentation?//

And this research paradigm, in 1982, was in existance for at least ten years. Although I cannot say that each study was supported by NSA allocations, it is noteworthy to consider previous publications by Dr. Svare, in all liklihood supported by federal funds, to wit:

- 1973 - "Postpartum aggression in mice: experiencial and environmental factors"
- 1975 - "Postpartum aggression in mice: inhibitory effects of estrogen"
- 1976 - "Suckling stimulation induces aggression in female mice"
- 1977 - "Maternal aggression in mice: influence of the young"
- 1980 - "Mice: suckling stimulation but not lactation important for maternal aggression"
- 1982 - "Maternal aggression exhibited by hypophysectomized parturient mice"

Precious federal money is spent annually on this sort of animal experimentation, which yields information of some interest to a select few, but of no value to large numbers of people whose health needs go unaddressed because of the gradual withdrawal of support to treatment providers. Does this situation reflect priorities in proper order?

To return to a previous point, the tradition of intertwining higher education and research that we have in this country explains both the waste of a tremendous amount of money as well as the policy of utilizing the criteria defining a good researcher to advance people up the academic ranks of pedagogery. Unfortunately, the characteristics of good researchers and good teachers have little in common. Yet, most major academic centers have a "research orientation", one major reason for which is that, according to NSF, federal research grants provide 70 percent of total university and college expenditures. This structure causes people to be attracted to medical careers who regard medicine more of a science than an art - which it is not - and who are not sufficiently concerned with the reduction of human pain and suffering. It also causes "grantsmanship" - the phenomenon of obtaining research grants at any cost, often without a valid human health question in mind, in order to balance the university budget. This, in turn, attracts to the faculty an overabundance of researchers who do not serve as good role models, motivators, teachers, or molders of future physicians. The "publish or perish" mentality which prevails destroys the atmosphere required to get a good education at any level - university or postgraduate/professional school.

In closing, I would urge the subcommittee to assess very carefully the advisability of expanding the NSF budget, and to consider redirecting some of the funds toward the provision of basic health care for sick persons who could utilize the medical techniques based on knowledge we already have and (some) research which has already been performed.

STATEMENT OF JOSEPH E. GRIMES, PROFESSOR OF LINGUISTICS, CORNELL UNIVERSITY, ON BEHALF OF THE CONSORTIUM OF SOCIAL SOCIETY ASSOCIATIONS

Senator STENNIS. Our next witness is Prof. Joseph E. Grimes, professor of linguistics, Cornell University. He is here on behalf of the Consortium of Social Science Associations.

Mr. GRIMES. Thank you, Mr. Chairman.

Senator STENNIS. We are glad to have you here, Mr. Grimes. You may proceed in your own way, sir.

Mr. GRIMES. Thank you. I would like to request that the full report that I will be summarizing be incorporated in the record when I finish the testimony.

Senator STENNIS. Very well. Without objection, that will be so ordered. The reporter will take notice.

Mr. GRIMES. Thank you.

I'm Joseph Grimes, professor of linguistics, Cornell University in New York. I also serve on the executive committee of the Linguistics Society of America.

Today I represent the Consortium of Social Science Associations, or COSSA, of which the Linguistics Society is a member.

COSSA represents 185,000 scientists across the spectrum of the social and behavioral sciences.

This is a bridge between the research world and the Washington community.

I am here to discuss the fiscal year 1987 appropriation for the National Science Foundation.

INCREASES IN NSF BUDGET SUPPORTED

The administration has proposed funding NSF at 13 percent above the levels that Gramm-Rudman-Hollings set for fiscal year 1986, and within that a 14-percent increase for research and related activities.

I urge the maintenance of the proposed increase even in this era of budgetary constraints.

Why? Because the money that is put into basic research is the seed corn of our Nation's continued economic competitiveness and security. It is growth over the long haul.

Now to look ahead. The increase for fiscal year 1987 in the Division of Economic Science—that is, the Division of Social and Economic Science—and the programs, including linguistics and the Division of Neural and Behavioral Sciences, they are lower than the increases that were proposed for fiscal 1986. Yet they do reflect continued support for these programs.

I'm pleased, for example, with the substantial increase for the Division of Information, Science and Technology, Mr. Chairman, where around 40 percent of the awards go to social and behavioral scientists.

Despite such encouraging points we are not satisfied. The proposed funding for fiscal 1987 actually leaves our social and behavioral sciences a full 27 percent below their 1980 levels in constant dollars, as exhibit A in the back of the testimony, shows.

We are barely coming back to the fiscal year 1980 levels in current dollars.

Fiscal year 1987 leaves us at best with only 4 percent of the NSF budget for research and related activities. That figure has been dropping for 4 years and is a full 2 percent below what this should be—below what its share was back in fiscal 1980.

COSSA believes that the subcommittee should include some language directing the National Science Foundation to spend at least 5 percent of their research and related activities budget on social and behavioral science research.

We believe that this is a justifiable goal in view of the vitality of these sciences and because of their importance to the Nation.

Mr. Erich Bloch, Director of the National Science Foundation, argues in favor of basic research as, "A force for present and future competitiveness" of the United States.

Even if we were to think only about science and technology in the international economy it is clear that, as a nation, we have not yet done our homework to learn how our partners in trade, development, and world security really see things.

At home we have barely begun to understand the impact of personal computers, jet airplanes, and hybrid corn on our own lives. We can be certain that in other countries the same products have a different significance. But we have not as yet committed the resources to understand how people there interact to this technological advancement.

That is why it does not surprise the behavioral scientist that we can be technologically excellent and economically noncompetitive at the same time.

VALUE OF LANGUAGE COURSES

If I may mention my own research, NSF funded one project that broke new ground by studying the language of entire discourses. When we took language courses in school we were then taught to make one sentence but we weren't taught to put 2, 3, or 4, or 20, or 200 together.

Languages have very different ways for setting up arguments or explanations or instructions or even simple narratives.

Some of this basic work is trickling now into language courses, and eventually this should make a difference in how well we handle trade and diplomacy.

My present focal point got its first boost from NSF which is, also, a wayin which distinctions and meaning are encoded in the grammars of different languages. Even the preliminary results have helped people who are trying to learn other languages in a way that grasps the thought of the other person accurately. It is also pointing the way toward a truly comprehensive kind of dictionary based on sound linguistic principles.

I would respectfully suggest that such research, along with that of many of my colleagues, which is included in the written testimony, not only addresses the question of the quality of life in the multilingual world, but this relates to the economic scene as well. That's why funding behavioral and social science research is a good investment.

It is necessary to realize that its results are usually not direct and obvious. We are out looking for the pieces of a rather large jigsaw puzzle, one that we can't put together until we find the pieces.

Thank you very much.

Senator STENNIS. All right. Thank you very much. We have already covered the proposition of the written statement you have with you. That will be made part of the record.

Mr. GRIMES. Thank you.

Senator STENNIS. All right. You certainly had some worthwhile testimony.

Mr. GRIMES. Thank you, Senator.

Senator STENNIS. Thanks again.

[The statement follows:]

STATEMENT OF JOSEPH E. GRIMES, PROFESSOR OF LINGUISTICS, CORNELL UNIVERSITY, ON BEHALF OF THE CONSORTIUM OF SOCIAL SCIENCE ASSOCIATIONS

Mr. Chairman, Members of the Committee:

I am Joseph Grimes, Professor of Linguistics at Cornell University in New York. I also serve on the Executive Committee of the Linguistics Society of America. I am here today representing the Consortium of Social Science Associations (COSSA). COSSA represents 185,000 scientists across the broad spectrum of the social and behavioral science disciplines, serving as a bridge between the research world and the Washington community. A list of COSSA's Members, Affiliates and Contributors is attached to my testimony.

I am here to discuss the FY 1987 appropriation for the Science Foundation (NSF). The administration has proposed a 13% increase above Gramm-Rudman-Hollings FY 1986 levels for NSF and a 14% increase for Research and Related Activities at the Foundation. This Subcommittee has been a strong supporter of basic scientific research. I strongly urge the maintenance of the proposed increase during the Subcommittee's deliberations. I know this is a difficult task in this era of budgetary constraints, but significant commitments to basic research, the seed corn of our nation's economic competitiveness and security, will keep the nation growing over the long haul.

Although they are not as substantial as the increases proposed in FY 1986, the increases for FY 1987 in the Division of Social and Economic Science and the behavioral science programs, including linguistics, in the Division of Neural and Behavioral Sciences, reflect continued support for these programs. We are quite pleased with the substantial increase for the Division of Information Science and Technology where approximately 40% of the awards go to social and behavioral scientists.

We are also pleased that the social and behavioral sciences will share in some of the special emphases of the Foundation for FY 1987. The Decision and Management Science program's increased funds for risk assessment, and the continued support for more sophisticated computerization of the social and behavioral science data bases, are indications of NSF's involvement of the social and behavioral sciences in its targeted research priorities. COSSA is also quite encouraged by Director Bloch's commitment to a role for social and behavioral scientists in the multidisciplinary projects at the Engineering Research Centers.

Despite such encouraging points, we are not satisfied. Although, if the FY 1987 proposed funding levels are maintained, the social and behavioral sciences will have finally been restored to their FY 1980 levels in current dollars, support for these sciences is still 27% below the 1980 levels in constant dollars (see Exhibit A). In FY 1987 we remain at only 4% of the NSF research and related activities budget, a figure that has declined over the past four years, and is a full 2% under the FY 1980 share of that budget.

COSSA believes that the Subcommittee should include language directing the NSF to spend at least five percent of the Research and Related Activities budget on social and behavioral science research. We believe this is a justifiable goal given the intellectual vitality and ferment in these sciences and their importance to the nation.

We are also not satisfied with the small increase for the Directorate for Science and Engineering Education (SEE). For too many years now the Foundation has stalled in supporting a full and vital SEE Directorate. The small increase proposed for FY 1987 comes on top of a deferral of FY 1985 appropriated funds. This Directorate helps train the new generation of scientists; and we believe it deserves greater support than it is getting from the Foundation.

Mr. Erich Bloch, Director of the National Science Foundation, argues in favor of basic research "as a force for present and future competitiveness" of the United States. It is clear that social and behavioral science research plays a vital role in competing in an international economy driven by science and technology. Economic competitiveness is achieved not only by developing new and better products, but also by understanding how to interact with those products, how to use them, how to manage the people who make them, in other words, the human behavior side of technological advancement. It is in these areas and others that social and behavioral science research offers the nation the resources and results to compete.

My own research, funded by NSF, broke new ground by studying the language of entire discourses: how different the ways are in which various languages set up arguments or explanations or instructions or even simple narratives. Some of this basic work is trickling now into language courses, and eventually should make a difference in how well we handle trade and diplomacy.

My present focus, which got its first boost from NSF, is on the ways in which distinctions in meaning are encoded in the grammars of different languages. Even the preliminary results have helped people who are trying to learn other languages in a way that grasps the thought of the other person accurately. It is also pointing the way toward a truly comprehensive kind of dictionary based on sound linguistic principles.

The Foundation has also backed my research on assessing the extent to which language factors are a barrier to communication anywhere on earth, even within our own society. Furthermore, I am tooling up at Cornell's Center for Theory and Simulation in Science and Engineering, our NSF-funded supercomputer, to explore by simulation the dynamics involved when the language of a minority group is squeezed out by that of a larger neighbor, with the difficult social consequences that arise.

A sampling of the scope and nature of other work in the social and behavioral sciences indicates the contributions, those already made and those with great potential, that continued and increased support from NSF will foster:

- Advances in theoretical economics and econometric modeling have led to advances in economic forecasting and economic policy. Although, economic forecasting is not perfect, these advances have narrowed the range of disagreement among economists in their ability to help policy-makers. As Herbert Simon has pointed out, the major differences that remain result from different assumptions about how people form expectations, a question that is now the focus of much social and behavioral science research.

- Great advances in statistical techniques, such as multidimensional scaling, have produced sophisticated methods of data analysis. These techniques continue to undergo improvement. Refinements in survey research methodology will produce more accurate indicators upon which many of our economic decisions are based. The access of social and behavioral scientists to new generations of computers will enhance these activities.

- The need to construct computer models of the international economy to adequately monitor its behavior is another activity where economists are playing a significant role in contributing to U.S. competitiveness.

- The theory of rational-decision making remains one of the major accomplishments of the social sciences in the past. Yet recently social scientists have discovered its limitations. The ability to determine how people, from elite policy makers in government and business to the man and woman in the street, make individual choices will strongly affect how the U.S. fares in this competitive world.

- Advances in cognitive psychology have led to experimentation that helps us understand how people process information and perform complex tasks. These techniques are being applied to important problems in education, business and professional decision-making, and man-machine interaction. All of these are related to keeping America on top scientifically and economically.

- Advances in the study of sensory perception have allowed us to understand how people perceive complex stimuli. The military is particularly interested in auditory and visual perceptions in order or their personnel to operate in multidimensional auditory and visual environments. A modern military reacting positively in complex environments keeps America secure.

- Keeping Americans healthy and productive is a major factor in maintaining the competitive edge. The work of social and behavioral scientists in relating good heath to behavioral factors has contributed to increased consciousness of how people control their own quality of life. This is especially true in keeping our rapidly aging population active, productive, and free of dependence on costly health care and maintenance.

- Research on criminal careers and career criminals has developed insights into why a portion of the population decides that illegal productive enterprise is more attractive than legal productive enterprise. America loses substantial dollars and sometimes talent to these illegal activities, creating more competitive disadvantages. Understanding why and developing methods to rechannel these activities can lead to more productive lives for these people and safer lives for everyone else.

- Studies of agenda formation and agenda setting in organizations demonstrate the importance of the agenda itself in decision-making. How issues reach the national agenda of government often determines the response to those issues. External challenges often focus our energies more than internally determined responses.

- How the United States competes internationally depends on our understanding of other governments and cultures. Social and behavioral scientists contribute to that understanding by focusing on international aspects of political, economic, and social choices. Evaluating the impact of different electoral systems on policy making, explaining international economic systems, and examining social and cultural differences of foreign nations have long been the purview of social and behavioral scientists.

- Direct utilization of social and behavioral science research on management styles and worker participation has revolutionized the automotive industry in this country. It is a shame that the Japanese and Swedes paid attention to this research earlier than our American companies. As sociologist William F. Whyte notes, it took the shocks of international competition to persuade industrial leaders in the United States of the need to make basic changes based on the organizational behavior literature.

- Research on the interaction between people and technology has led to attempts to revitalize America's shipping and shipbuilding industries. The work of Einar Thorsrud in Norway involving physically re-designing ships and reducing social and status differences among people on the ships, has formed the basis of changes in human resource utilization in the U.S. maritime industry.

- Social scientists are being called upon by State governments to conduct policy research and technical assistance designed to aid in the revitalization of U.S. industry.

- Examining the impact of Employee Stock Ownership Plans (ESOPs) and worker cooperatives is another example of social science research contributing to better understanding of economic productivity to keep this nation competitive.

A briefer sampling of the research in social and behavioral sciences further suggests the vitality and ferment that make support for these sciences so important to continued economic competitiveness. Topics currently being studied include:

- microsimulation models to help target federal funds to those who most need them;
- human adaptation to stressful environments;
- assessment of risks in occupational settings;
- attracting more women and minorities into science;
- developing computerized models of transporting food from surplus areas to deficit regions in countries around the world;
- youth unemployment; female participation in the labor market; why people change jobs;
- economic constraints on single parent households;
- understanding and predicting human responses to natural and technological disasters;
- comparing the largest metropolitan areas of the country concerning urban land use, population distribution, transportation use, and other critical urban functions;
- social components of alcohol and drug abuse;
- decision-making by farmers and their response to the agricultural crisis;
- the impact of different housing arrangements on the elderly;
- the impact of inflation and deflation and other economic changes on American families;
- the cognitive capabilities of very young children and ways to cope with a teacher shortage for this group.

These lists are by no means exhaustive. They are presented to illustrate that these sciences are conducting research into all areas of human activity that affect the current and future productivity and competitiveness of this nation. As we said last year, research in social and behavioral science does not always yield the solution to the problems it investigates, but increasingly it provides decision-makers with the information to make better and more informed decisions.

We would like to thank this Subcommittee for its support of the social and behavioral sciences in the past. We call on you to move oward more equitable support for these sciences by increasing their allocation within the NSF budget.

Thank you for allowing us to present our views.

NOTE:
USED FY82 DOLLARS
FROM FY80 ON

HISTORY OF SOCIAL AND BEHAVIORAL SCIENCE FUNDING AT THE NATIONAL SCIENCE FOUNDATION

	FY80	FY81	FY82	FY83	FY84	FY85	FY86 (EST)	FY87 (EST)
SOCIAL AND ECONOMIC SCIENCES (Current Dollars)	$31.4	$25.1	$17.6	$20.3	$24.6	$28.6	$28.6	$31.4
(Constant Dollars)	$37.1	$26.9	$17.6	$19.5	$22.7	$25.5	$24.7	$26.0
BEHAVIORAL SCIENCES(BNS)*-(Current Dollars)	$21.1	$18.5	$15.0	$16.6	$18.6	$23.3	$21.3	$23.6
(Constant Dollars)	$24.9	$19.8	$15.0	$15.9	$17.2	$20.8	$18.4	$19.6
TOTAL BEHAVIORAL AND SOCIAL SCIENCES-(Current Dollars)	$52.5	$43.6	$32.6	$36.9	$43.2	$51.9	$49.9	$55.0
(Constant Dollars)	$62.0	$46.8	$32.6	$35.4	$39.9	$46.2	$43.0	$45.6
GNP Deflators	0.85	0.93	1.00	1.04	1.08	1.12	1.16	1.21

*Includes psychobiology
Source: NSF Budgets to Congress, FY 1976-1985
12/11/84

EXHIBIT A: Source: The National Science Foundation

CONSORTIUM OF SOCIAL SCIENCE ASSOCIATIONS

Members

American Anthropological Association
American Economic Association
American Historical Association
American Political Science Association
American Psychological Association
American Sociological Association
American Statistical Association
Association of American Geographers
Association of American Law Schools
Linguistic Society of America

Affiliates

American Association for Public Opinion Research
American Educational Research Association
American Evaluation Association
American Society of Criminology
Association for Asian Studies
Association for the Social Sciences in Health
Eastern Sociological Society
Economic History Association
Gerontological Society of America
History of Science Society
International Studies Association
Law and Society Association
Midwest Sociological Society
National Council on Family Relations
National Council for the Social Studies
North Central Sociological Association
Northeastern Anthropological Association
Operations Research Society of America
Population Association of America
Regional Science Association
Rural Sociological Society
Social Science History Association
Society for American Archaeology
Society for the History of Technology
Society for Research in Child Development
Society for the Scientific Study of Religion
Southern Sociological Society
Southwestern Social Science Association
Speech Communication Association
The Institute of Management Sciences

Contributors

University of California, Berkeley
University of California, Los Angeles
University of California, Santa Barbara
Carnegie-Mellon University
Center for Advanced Study in the Behavioral Sciences
Center for International Studies, Duke University
University of Chicago
University of Colorado
Columbia University
Cornell Institute for Social and Economic Research
Cornell University
Florida State University
Harvard University
University of Illinois
Indiana University
Institute for Research in Social Science, UNC-Chapel Hill
Institute for Social Research, University of Michigan
University of Iowa
The Johns Hopkins University
Massachusetts Institute of Technology
Maxwell School of Citizenship and Public Affairs, Syracuse University
University of Michigan
University of Missouri
University of Nebraska
New York University
University of North Carolina, Chapel Hill
Ohio State University
University of Pennsylvania
Pennsylvania State University
University of Pittsburgh
Princeton University
Rutgers University
Social Science Research Council
University of Southern California
Stanford University
State University of New York at Stony Brook
University of Tennessee, Knoxville
Texas A & M University
Tulane University
University of Washington
University of Wisconsin, Madison
University of Wisconsin, Milwaukee
Yale University

Senator **Stennis**. All right. We will proceed with the hearing again now. Another member of the committee has been detained for some reason. Since I am interested in this matter here I will just stay on until I am relieved.

STATEMENT OF PAULINE H. BROOKS, DIRECTOR, PUBLIC TELEVISION DEVELOPMENT, CHILDREN'S TELEVISION WORKSHOP

Senator **Stennis**. The next witness is Pauline H. Brooks.

Come around, please, and have a seat. She is the director of the Public Television Development, Children's Television Workshop.

We are glad to have you here. You just proceed now in your own way.

Ms. **Brooks**. Thank you very much. I appreciate that, Mr. Chairman.

Good afternoon. It is certainly a pleasure to be here, Mr. Chairman.

As you just correctly said, I am Pauline Brooks, director of Public Television Development for the Children's Television Workshop.

SCIENCE EDUCATION VITAL

I am here today to urge this subcommittee to appropriate a sufficient level of funds for fiscal 1987 to allow the National Science Foundation to continue its vital support of science education.

The NSF provides partial funding of approximately $1.5 million a year for 3-2-1 CONTACT, which is our educational television series that makes science more appealing and more understandable to the millions of 8- to 12-year-old viewers.

The NSF has also committed $5 million toward the first season of a brand new children's television workshop series on mathematics; also for 8- to 12-year-olds. This new math series that is entitled "Square One TV" will help address the national crisis in math education by using the power and impact of television to motivate children to learn and to use mathematics and to acquire certain problem-solving skills.

The 75 half-hour programs will start airing on the PBS stations in January 1987. The programs will be suitable for viewing both at home and in the schools.

Additional funds for this series are being provided by the Department of Education, the Corporation for Public Broadcasting, two foundations, and the IBM Corp.

I would particularly like to stress, however, how very important it is for us to have Federal funds in place to then leverage private moneys into a project of that nature.

3-2-1 CONTACT AND SQUARE 1 TV

In fact, the NSF has taken a very significant leadership role in enabling both 3-2-1 CONTACT and Square One TV to go forward. We will be asking the foundation for further funds to provide additional programs in the future.

The recent report issued by the National Science Foundation Board asserts that the United States cannot keep its edge in the economic and technological competition unless there is a very rapid improvement in science, engineering, and math education.

This report was focused on the college level. However, the national problem with science and math literacy does not begin at the college or high school level. It starts in the elementary grades.

The fact is that the children in this country, most especially girls and minorities, are not interested and are then turned off by math and science by the time that they begin high school. Positive motivation, interest and a sense that they can master these subjects needs to occur in the late elementary years or grades.

These are precisely the goals of 3-2-1 CONTACT and Square One TV.

We feel that we can all help this situation by giving sustained attention to children's educational television, a mechanism that's already in place and that's available and appealing to rich and poor, girls and boys alike.

This is also highly cost effective. For example, 3-2-1 CONTACT costs only 1 penny per person of viewing. Children's television workshop tries hard to ensure that our programs have an impact beyond the screen by providing teacher guides, providing teacher training workshops, programs with science museums, Girl Scouts of America, and the science clubs for children across the Nation.

Math and science illiteracy is a national fact of life. But there are no television illiterates. Children watch television 27 hours per week, which is as much time or more, than most of them spend in school. Children's television can be constructively educational, not just the opposite.

Our programs, as well as others, have proved that children will watch and they will pay attention to educational programming that is carefully designed and effectively produced for them.

Federal funding is essential to ensure the production of programs such as 3-2-1 CONTACT and Square One TV. The National Science Foundation is a vital funding source for these educational television efforts in science and math education. With your help they can sustain and build on the progress that they have already achieved.

The NSF's science education program merits and needs your continued support.

Thank you, Senator.

Senator STENNIS. Yes, ma'am. Thank you very much. This was a good contribution you have made here. We are glad to have it in the record and available for the public as well as our committee.

Ms. BROOKS. Thank you, Senator.

Senator STENNIS. Your statement is part of the record.

[The statement follows:]

STATEMENT OF PAULINE H. BROOKS, DIRECTOR OF PUBLIC TELEVISION DEVELOPMENT, CHILDREN'S TELEVISION WORKSHOP

Thank you for the opportunity to appear before you today. I am here to urge this Subcommittee and the Congress to appropriate an adequate level of funds for fiscal year 1987, to enable the National Science Foundation to continue its vital support of science education.

Children's Television Workshop has a direct interest in these appropriations. The National Science Foundation (NSF) provides partial funding, at the level of $1.5 million plus per year, for 3-2-1 CONTACT, our educational television series that aims to make science more appealing and understandable to its millions of 8-to-12 year-old viewers.

The NSF has also commited $5 million toward the first season of a new Children's Television Workshop series on mathematics, also for 8-to-12 year-olds. This new mathematics series will help address the national crisis in math education by using the power and impact of television:

-- to promote enthusiasm for and interest in mathematics;
-- to encourage the use and application of problem-solving strategies in mathematics;
-- and to present sound mathematical content in an interesting and meaningful way.

The 75 half-hour programs will be suitable for viewing both at home and in the classroom, and teacher guides will be available. The anticipated airdate is January 1987. As with 3-2-1 CONTACT, we anticipate that the series will be broadcast by most of the public television stations around the country both during the day for in-school use and in the late afternoon for home viewing.

In addition to the $5.0 million provided by NSF, the Corporation for Public Broadcasting and the Department of Education have each committed $3.0 million to the math series. Support is also being provided by Carnegie Corporation of New York, the Andrew W. Mellon Foundation and the IBM Corporation. I would like to stress how very important federal funds are in leveraging private monies into a project of this type. With federal support in place, our discussions with IBM resulted in a major production grant from them, and IBM is the first corporation in a long time to make a large commitment to children's programming.

Regarding our children's science series, 3-2-1 CONTACT, the National Science Foundation made a long-term commitment to provide more than a third of the funding necessary to produce 20 new programs in each of the next 3 years -- $1.5 million plus each year. The planned funding effort had included matching money from DOE. However DOE has provided only $1.0 million this year and does not plan to provide any funds at all for the final two seasons. This lack of continuation funding from DOE is seriously threatening our ability to continue production of the minimal 20 shows per year. This is particularly bad news when, for the first time, we are in a position to be able to begin to put together a daily hour of educational programming for 8-to-12 year-olds (a half-hour of math and a half-hour of science, 3-2-1 CONTACT).

CPB has been providing $1.0 million each fiscal year toward 3-2-1 CONTACT and plans to continue to do so for the remaining two seasons.

The new math series is the first significant addition of new programming to the PBS children's block since 3-2-1 CONTACT started in 1980. This children's block is the only sustained educational programming available for children. Since children are going to watch television anyway, it is crucial to provide and sustain entertaining and informative age-appropriate programming for them.

The NSF has taken a very significant leadership role in enabling these two series to go forward and we will be asking the Foundation for further funds to provide additional programs in the future.

A report issued in March by the prestigious National Science Foundation Board states "The deterioration of collegiate science, mathematics and engineering education is a grave and long-term threat to the nation's scientific and technical capacity, its industrial and economic competitiveness, and the strength of its national defense." The report says that fewer students are choosing careers in science and engineering, that certain specialties are not attracting the entrants they need and that enrollment in teacher education in mathematics and the sciences is "critically low."

Mr. Chandler, President of the Association of American Colleges said "The United States cannot keep its technological edge and its edge in economic competition unless there is very rapid improvement in education in science, engineering and mathematics."

The above mentioned report focuses on the college level. However, the national problem with scientific and math literacy does not begin at the college or high school level. The problem starts at the elementary grades, where teachers are least prepared to teach science or math, and where states are least rigorous in setting standards for science curriculum and for certification of science teachers. Moreover the fact is that children in this country -- most especially girls and minorities -- are uninterested and turned-off by math and science by the time they begin high school. Positive motivation, interest and a sense that they can master these subjects needs to occur in late elementary years.

These, of course, are precisely the goals of 3-2-1 CONTACT and our math series. Television can supplement work in the schools, and do things visually in these subjects which most schools simply cannot.

Each week on average 4 million viewers watch 3-2-1 CONTACT at home. With the combination of some new programs each year and repeat airings of earlier seasons, 3-2-1 CONTACT costs only one penny per-person per-viewing.

Children's Television Workshop works hard to ensure that our programs have an impact beyond the screen. 3-2-1 CONTACT Teacher's Guides are provided and teacher training workshops conducted around the country. Over 750,000 copies of the Teacher's Guide have been distributed so far. Strong participatory activities are taking place with a variety of organizations such as sicence museums and the Girl Scouts of America. Science clubs for children based on the series are also gaining momentum with club packages and activity guides being provided. Similar activities will take place around the math series.

Children are a very under-served portion of our population. Senator Moynihan's new book "Family and Nation" points out the declining condition of this nation's children, which is largely a result of the changing family structure, specifically the increase in the number of single-parent families. They are the "new" poor of our country.

We can help them by giving sustained attention to children's television -- a mechanism that is already in place to provide educational programming. It is a highly cost effective means of supplemental education -- available and appealing to rich and poor -- girls and boys alike.

It is vital to increase the momentum of constructive programming at a critical time in our children's lives.

Math and science illiteracy is a national fact of life, but there are no television illiterates -- children watch it every day. From six to eleven years-old, on average they watch 27 hours per week -- as much, or more, time as most spend in school.

Our choices are not limited to trying to mitigate the widely perceived bad effects of television for children. Childrens television can be constructively educational -- not just the opposite. And our own programs -- SESAME STREET, THE ELECTRIC COMPANY, 3-2-1 CONTACT, as well as other educational programs, have proved that children will watch and pay attention to educational programming carefully designed and effectively produced for them.

Federal funding is essential to ensure the production of programs such as 3-2-1 CONTACT and our math series. The National Science Foundation stands as a essential funding source for these television efforts in science and math education. With your help they can sustain and build on the progress already achieved.

The NSF's science education program merits and needs your continued support.

Thank you.

Senator STENNIS. We will now take a short pause here as Senator Johnston of Louisiana, a member of our subcommittee, will assume the chair.

[Pause.]

Senator STENNIS. Well, all right; he is not here yet. We will continue on. I am sure that it will be all right with Senator Johnston that we proceed.

STATEMENT OF ELLIS K. FIELDS, PAST PRESIDENT, AMERICAN CHEMICAL SOCIETY

Senator STENNIS. The next one on our list is Dr. Ellis K. Fields, past president, American Chemical Society.

All right, Dr. Fields, we appreciate your being here. We look forward to your testimony. You may proceed in your own way.

Dr. FIELDS. Mr. Chairman, members of the subcommittee, my name is Ellis K. Fields.

Senator STENNIS. May I ask a question before you continue, Dr. Fields?

Dr. FIELDS. Yes, Senator.

Senator STENNIS. Can the audience hear the witness? All right, fine. We want you to be able to hear.

Please proceed, Doctor.

Dr. FIELDS. My name is Ellis K. Fields. I'm the immediate past president of the American Chemical Society. I'm also a senior scientist at the Amoco Chemical Co.

I appear before you today with the approval of the society's board of directors to present the highlights of our statement on the National Science Foundation's fiscal year 1987 appropriations.

I request that the complete ACS statement be entered into the hearing record when I complete my testimony.

Senator STENNIS. Very well. We will be glad to have it in the record. Mr. Reporter, you will please put it into the record.

Dr. FIELDS. Thank you, Senator.

STATEMENT HIGHLIGHTED

The health of U.S. industry, particularly the chemical and allied product industry, owes a great deal to the basic chemical research conducted in our university laboratories.

The recently published report from the National Academy of Sciences entitled, "Opportunities in Chemistry" describes how advances in the chemical sciences are the key to new processes and materials, more energy and food, a cleaner environment, and better health for the citizens of the world.

The National Science Foundation plays a key role in ensuring the exploration of opportunities in basic research, particularly in those research areas that are not pursued by the mission agencies.

Another major role of the NSF is the responsibility for the overall health of the academic support structures that produce this Nation's scientific and engineering manpower.

I wish to emphasize these points.

AREAS OF SUPPORT EMPHASIZED

First. We urge the congress to support the administration's requested increase for NSF's research and related activities. This request includes a 17.6 increase in funding for the Foundation's Chemistry Division. This is a small increase when compared to the potential benefits for the economy and for our society as a whole.

Second. ACS supports the activities of the Directorate for Science and Engineering Education. This Directorate surely will require a larger expenditure of funds in future years to support its mission. This is especially to implement new programs at the undergraduate level which was badly needed, as indicated by the recent National Science Board Committee report.

Third. The society supports NSF's effort to assess the need for new and renovated scientific facilities. Further, we believe that a competitive, merit-based peer review process should be the primary mechanism for the selection of proposals for the large-scale research centers and facilities, as well as for the selection of proposals for research and instrumentation designated for these facilities.

Fourth. The NSF is to be applauded for its programs that enhance the participation of underrepresented groups or institutions in research activities that improves the Nation's scientific and engineering infrastructure. Also important is the foundation's continued support for productive communications between U.S. scientists and the scientists in the other countries.

In conclusion, the society would like to note that chemistry makes contributions to our national progress that are most impressive. Our entire world is made of material that lends itself to preservation, substitution, and transformation. These activities are carried out through chemical science and technology.

Now continued support for research in these areas and for education and training in the chemical and related sciences is essential to ensure advances by the Nation's industries and the subsequent scientific and technological leadership of the United States.

The American Chemical Society appreciates the opportunity to express its views to the subcommittee as it considers NSF's fiscal year 1987 appropriations.

Mr. Chairman, that particular portion completes my testimony on behalf of the American Chemical Society.

I would like, if you will allow, to add a brief personal statement.

Senator STENNIS. Yes.

Dr. FIELDS. Thank you, Mr. Chairman.

PERSONAL STATEMENT

The National Science Board has recently published a report of its task committee on undergraduate science and engineering education. This report recommends a substantial NSF effort in undergraduate science and engineering education. It reveals that, for over 20 years, from 1963 to 1986, the total NSF appropriation has oscillated about 15 percent on either side of an average amount of $1.17 million in 1982 dollars.

The administration's 1987 budget request for that fiscal year with a real dollar increase of 4.1 percent is the first breakthrough, increase in overall funding in over 20 years, Mr. Chairman.

However, during this same period, NSF funding for science and engineering education has decreased steadily from a plateau in 1964 to 1968 equivalent to $360 million in 1982 dollars down to the present level of under $75 million.

In fact, the purchasing power in the 1987 budget request for science and engineering education is less than that of the fiscal year 1986 appropriation.

I can assure you that the steady decline of NSF funding for science and engineering education since 1968 has not been, and is not now, in the national interest.

Thank you, Mr. Chairman.

Senator STENNIS. We thank you very much for your very learned and very helpful and valuable testimony.

Your presence here also is encouraging to us. I do feel encouraged that we are realizing these truths that you have related here more and more. Traffic is rather fast around here when it comes to appropriating money. We have been paying out more than we were receiving.

Dr. FIELDS. Yes.

Senator STENNIS. The country and the Congress will get on top of that problem.

Dr. FIELDS. Yes.

Senator STENNIS. We want you to continue doing this valuable work. Keep your fine work going.

Dr. FIELDS. Thank you.

Senator STENNIS. It is very valuable work indeed, Dr. Fields.

Thank you for coming.

Your complete statement is included in the record without objection.

[The statement follows:]

STATEMENT OF DR. ELLIS K. FIELDS ON BEHALF OF THE AMERICAN CHEMICAL SOCIETY

Mr. Chairman and Members of the Subcommittee:

My name is Ellis K. Fields. I am Immediate Past President of the American Chemical Society, and I am also a research consultant, Amoco Chemical Company. I appear before you today with the approval of the Society's Board of Directors to present the ACS statement on the National Science Foundation Fiscal Year 1987 budget. I request that the complete ACS statement be entered into the record.

The NSF Organic Act directs the Foundation to initiate and support basic research and education programs at all levels. The Foundation's importance to the scientific research and education enterprise in the U.S. is beyond dispute. NSF bears the major responsibility for maintaining the health of basic scientific research in the U.S. It accounts for about 28 percent of federal support for basic research in academic institutions and maintains U.S. scientific strength by funding research in all fields of science and engineering. It is in the best interest of the country for Congress to fund the NSF at least at the level proposed by the Administration for FY 1987. Under this proposal, support for Research and Related Activities would increase from the FY 1986 Gramm-Rudman-Hollings figure of $1,294.1 million to a total of $1,479.0 million in FY 1987, representing an increase of $184.9 million or 14.3 percent.

While many features unite the various scientific disciplines, these disciplines differ in their organizational patterns and in their top-priority research needs. For example, in high energy physics, an accelerator may hold the key to progress; in astronomy, a large telescope may be central to future advancement. Progress in chemistry today arises from a significant number of small but well-equipped laboratories.

What happens in these laboratories is very important to societal needs and for the economic competitiveness of this Nation. Due to its nature, chemistry inherently makes contributions to our national progress that are most impressive. Our entire physical world is made of material that lends itself to preservation, substitution, and transformation. These activities are carried out through chemical science and technology. Most scientific disciplines, ranging from molecular biology to astronomy, make use of chemistry. A large number of industries use chemistry in the manufacture of their products. The routine analytical sciences which support the nation's health systems use chemistry. Chemistry is truly a pervasive science.

The recently published National Academy of Sciences/National Research Council (NAS/NRC) Report, Opportunities in Chemistry, details how advances in the chemical sciences can be the key to future progress leading to new processes and materials, more energy and food, a cleaner environment, and better health for the citizens of the world. These advances are dependent upon ideas and experimental results emanating from basic research studies.

The support of the National Science Foundation is essential to the vitality of the research base residing in our academic institutions. In fiscal year 1984, NSF provided 47 percent of the federal obligations for basic research in chemistry performed by universities and colleges; most of this support was contributed by the NSF Chemistry Division.

The American Chemical Society endorses the recommendation of the NAS/NRC Report that states that the NSF Chemistry Division budget should be doubled over a three-year period. The Society likewise endorses the following emphases in the FY 1987 request for the NSF Chemistry Division:

- Initiation of a five-year plan in shared instrumentation to fund ongoing maintenance and operations support associated with new instruments, and increased allocations for dedicated instruments in FY 1987. The ACS, as well as the NAS/NRC Report, recommends that annual operating and maintenance costs be built into the NSF shared instrumentation program, and that funds for dedicated instruments be increased. In addition, there is an initiative in computational chemistry. The ACS supports this initiative which will effectively integrate use of computers by researchers.

- Support for collaborative research activities in materials chemistry, chemical catalysis, and development of new modern instruments, as well as collaborative and individual investigator projects in the chemical underpinnings of biotechnology. These research areas are among the fields of study which the Academy Report identified as providing opportunities for significant intellectual advancement that will also help yield social and economic returns for the United States.

- Increase of the average grant size in FY 1987 over the FY 1986 figure.

While the overall increase of 17.6 percent above the FY 1986 Gramm-Rudman-Hollings figure in the Chemistry Division's budget is healthy, it falls short of the 25 percent increase recommended in the Academy Report. Nevertheless, it is an important step in the right direction that must be preserved in the FY 1987 budget process, and maintained in future fiscal years. The ACS urges Congress to support this requested increase in chemistry, which is small when compared to the potential benefits to the economy and our society as a whole.

The ACS believes that as a nation we must insure that the human resources needed by our industries are well-trained and educated. The Foundation is the lead federal agency that attends to the overall health of the academic support structures that produce the Nation's scientific and engineering manpower. Without this continued NSF support, the Nation will be deferring the training of numbers of scientists and engineers who are critically needed by U.S. industry. Chemistry is an especially crucial area since chemists make up the bulk of physical scientists employed by U.S. businesses. Our other major comments on the NSF FY 1987 request focus on this support structure and are summarized as follows:

- The American Chemical Society notes that the Directorate for Science and Engineering Education will surely require a larger expenditure of funds in future years to accomplish its overall goals. The Foundation is to be commended for its programs in the K-12 areas; however, new programs are needed at the undergraduate level where future scientists and engineers receive their education.

- The Society is pleased that NSF is proceeding with a study of the need for new or renovated scientific facilities. The ACS supports a competitive, merit-based peer-review process. Such a process must be the primary mechanism for selection of proposals for large-scale research centers and facilities, as well as for the selection of proposals for research and instrumentation designated for them.

- There is broad recognition that continued productive communications between U.S. scientists and scientists in other countries are important to economic development. The ACS supports the FY 1987 budget request for International Activities, but regrets that the Foundation does not seem to have sufficient resources to add new cooperative research activities.

- The Foundation is to be applauded for its programs that enhance the participation of underrepresented groups or institutions in research activity and that improve the Nation's scientific and engineering infrastructure. The ACS is pleased that Presidential Young Investigators, Visiting Professorships for Women, Research Opportunities for Women, Support for Predominantly Undergraduate Institutions, Minority Research Initiation, and Research Improvement in Minority Institutions are among those programs with a continued funding commitment.

In conclusion, the ACS is heartened to see that the importance of basic chemical research and of education is stressed in the Foundation's budget request. The Society urges Congress to continue support for these areas at a time of fiscal restraint.

STATEMENT OF LE VAR BURTON, HOST OF READING RAINBOW, PUBLIC TELEVISION SERIES

Senator STENNIS. We will proceed here now until we come to a stopping place where we can change horses.

Our next witness, and we will welcome this one, too, is Mr. LeVar Burton. This is the host of Reading Rainbow, Public Television Reading Series.

All right, please come around here and have a seat. I'm glad to have you here. You may proceed in your own way here, please.

Mr. BURTON. Thank you, Senator. It is my pleasure.

I would like, Senator, if you don't mind, to submit the written statement of Mr. Peter M. Fannon, president of the National Association for Public Television Stations. I would like to have that submitted for the written record here, Senator.

Senator Stennis.You are submitting that for the record, Mr. Burton?

Mr. BURTON. Yes.

Senator STENNIS. All right.

Mr. BURTON. Thank you, Mr. Chairman. This is from Mr. Fannon.

Senator STENNIS. All right. It is submitted for the record, Mr. Reporter, at this point.

Mr. BURTON. I would also like to thank this subcommittee for the opportunity to present my views on television programming as they specifically relate to the world of science, Mr. Chairman.

Senator STENNIS. Let me interrupt you for just a minute, Mr. Burton.

Mr. BURTON. Yes, sir.

Senator STENNIS. I am delighted to introduce to this fine audience here Senator Johnston of Louisiana. He makes things move when he starts out. He is interested in this, I know.

If I may now just turn this over to you. This gentleman is starting. I will vacate this spot so that you can be over here.

Senator JOHNSTON [presiding]. Thank you.

Senator STENNIS. We have gotten some valuable testimony here. We have had some exhibits to this which we had also put in the record. I am delighted to have been here for this short time. I hope next year that you can come back and be a witness again.

Mr. BURTON. Thank you.

Senator STENNIS. All right, Senator Johnston.

Senator JOHNSTON. Thank you.

Mr. Burton, we want to welcome you again to the committee.

Mr. BURTON. To catch you up here, I have asked that the written statement of Mr. Peter Fannon, president of the National Association of Public Television Stations, be submitted for the written record.

Senator JOHNSTON. Yes, without objection.

Mr. BURTON. Thank you very much.

[The statement follows:]

STATEMENT OF PETER M. FANNON, PRESIDENT, NATIONAL ASSOCIATION OF PUBLIC TELEVISION STATIONS

The National Association of Public Television Stations (NAPTS) is pleased once again to present testimony in support of the important educational programs funded by the National Science Foundation (NSF). Our membership, the nation's public television stations, has utilized funds from NSF directly or indirectly to present to the American public high quality science education television programming. We have been grateful for this important federal support which has responded to the clear need for science and mathematics education nationwide.

The Congress and the American public continue to view with alarm the state of science and mathematics education at all levels from elementary to post-graduate. There continues to be a critical national shortage of qualified math and science teachers, and higher levels of science education are losing ground in their struggle to keep up with technology.

Alarming though these trends may be, there has been in recent years a concerted effort by the government to encourage the study of these vital fields by our nation's young people. An important part of this effort has been the nation's public television stations, whose many science programs continue to attract large audiences at home and in the classroom.

We in public television have seen a tremendous response to the many science programs, some of them supported by NSF, that our stations produce and dsitribute. Science programs distributed by the Public Broadcasting Service (PBS) reach some 18.5 million households -- or 46 million viewers -- in this country every week. Science and nature programs, with subjects ranging from tigers to sharks to the human brain, represent the top four spots on the list of all time most-watched PBS evening programs. And, taken as a group, science programming on public television geared for all age and education levels attracts more viewers than public affairs or cultural and entertainment programming.

By providing innovative, high quality science programming free to its viewers, public television is not only filling a void for this kind of programming not found regularly on other stations, but it is responding to the hunger the American people have for science education.

Our eight-part landmark series The Brain, partially funded by NSF's Science and Engineering Education Directorate (SEE), first ran in 1984 to wide critical and academic acclaim, and is currently in its second showing on most public television stations. This series' overwhleming success has pointed very clearly to how the cooperative efforts of the federal government's science-related agencies and the public television system can combine to produce needed, academically-oriented and well-received science programming.

Due to its extraordinary success, a sequel to the series entitled The Search for Mind has now commenced in production for a projected airing in the 1988-89 season. The new series will focus not only on the science of the brain itself, but on what role the brain plays in human development. The interdisciplinary approach used will feature such topics as aging, addiction, communication, and thinking.

WNET/New York, the producer of the series, has already received an extraordinary advance commitment of $1 million from the nation's public television stations to purchase and carry the series when it is completed. More important, however, is the commitment of $500,000 the series producer has received from NSF. The highly technical nature of the series, involving the consultation of top-level scientists and the use of advanced video animation, translates into high production costs, in this case estimated at over $8 million for nine one-hour programs. The importance of the support of the NSF in such a monumental undertaking cannot be overestimated.

The original The Brain series has been adapted for use by many two and four-year colleges and universities as a credited course, "Brain, Mind, and Behavior." Its successor will also be used for strictly educational purposes during and after its original broadcast for both secondary and post-secondary institutions.

The weekly science series NOVA produced by WGBH/Boston received initial important NSF support in 1972 and was continually nurtured by the NSF until our stations could afford the programs' costs themselves. Three NOVA programs appear on the list of most-watched programs in PBS history; the series is regularly seen by as many as 20 million Americans per broadcast. Nearly 95,000 high school teachers use the series to educate over 10.5 million students natiowide, making them the most widely used PBS programs as instructional television in our nation's schools.

In the area of children's science and math educational television, the NSF has helped make possible the development and production of 3-2-1 Contact and a new math series to premiere next year. Both of these series are geared to the 8 to 12-year-old viewer, and both are produced by the Children's Television Workshop, producer of Sesame Street and The Electric Company.

3-2-1 Contact is carried on 218 of our public television stations and is seen by 7.5 million viewers each week. NSF provides partial funding for the series, $1.5 million per year, along with substantial funding help from the U.S. Department of Education in order to allow for the yearly production of new episodes to the series. The series is designed not only to educate young people in science subjects, but also to encourage their interest in scientific study. Over 750,000 elementary school teachers receive the program's companion teacher guide, and science museums and schools have established weekend activities to support and extend the enthusiasm created by the program.

A new funding commitment from the NSF will allow another of public television's very successful children's series to expand its scope. Reading Rainbow, the highly acclaimed summer reading series hosted by LeVar Burton is co-produced by Great Plains National Instructional Television Library and public TV station WNED-Buffalo, New York, in association with Lancit Productions, New York City. This series has now received a commitment from NSF to add special science programs to the series. NSF is awarding the series $200,000 in this fiscal year for five new programs featuring science reading, and another $200,000 for five more for next year. Other major funders include the Corporation for Public Broadcasting (CPB), B. Dalton Booksellers, and the Carnegie Corporation.

Reading Rainbow has already prompted measurable interest in summer reading by children nationwide. According to the results of a survey completed by RMC Research of children's librarians, 46% of those surveyed reported an increase in summer reading prompted by the series, 67% of the librarians attributed at least some degree of increase in book circulation to the series, and most importantly, 75% believed the series also stimulated parents' interest in children's reading. The results of this national survey paint Reading Rainbow as an unqualified success from the perspective of children's librarians and energetic in the sense of overall activity in homes and libraries as children and parents have made the connection between television viewing and the enjoyment of reading good books.

With the addition of new science programsto the series, it will be possible to generate more enthusiasm for science reading and learning during the school vacation months.

We are all too well aware of our need to upgrade science teaching nationwide. From our perspective in public television, this situation is as unfortunate as it is unnecessary. The program production and distribution capabilities of this nation's educational television system offer a unique resource for the improvement of elementary and secondary science and mathematics education on a wide scale and in a cost-effective manner. Because our system reaches about 95% of the U.S. population, it is especially well-suited to reaching vast numbers of people as well as targeting specific pockets of students. Public television stations can develop and provide a comprehensive package of teacher-training materials--programs that can be used as in-service teacher training or as college-credit courses.

This kind of programming in cooperation with individual public television stations has been supported by NSF in the past. One series currently available for distribution to colleges and teachers was produced by the **New Jersey Network** in 1983 with a grant from NSF. You, Me, and Technology aims to help viewers achieve technological literacy and an objective attitude toward technologies that searches for the trade-offs between their costs and benefits.

Public television also needs more college level courses, not just for our teachers, but for others in the workforce who need to upgrade their education. PBS's Adult Learning Service (ALS) is doing just that. By providing "telecourses"--college-level television series supplemented and reinforced with textbooks, study guides, and class meetings--PBS is reaching half a million college and university students at over 750 institutions of higher learning across the country.

A recent survey commissioned by the CPB/Annenberg Project of ALS students found that over two-thirds of the students were female, only 23 percent of the students were of traditional college age (18-22 years olds), most were in 23-29 year old categories, and the proportion of women increased with age. The survey also showed that 40 percent of the students in telecourses enrolled because an on-campus section of the course would conflict with their work schedules.

As stated previously, the series The Brain is the basis for the television course Brain, Mind and Behavior currently offered by the ALS. A physics course produced by the California Institute of Technology and the Southern California Consortium and offered by ALS this year, The Mechanical Universe, is attempting to provide three levels of physics instruction, one of them in cooperation with NSF. The Mechanical Universe can be geared either to liberal arts students fulfilling a general science requirement, to the science or engineering majors demanding more rigorous preparation, or to the secondary school teachers seeking to upgrade their physics teaching skills.

NSF has sponsored this last application by initiating a project in which parts of the course have been adapted for use in high school classrooms. Teachers who find themselves teaching high school physics in spite of inadequate preparation will find that by enrolling themselves in The Mechanical Universe course and using the NSF video modules in their classes, they will be able to present their students with instruction of the highest quality.

Because of the success of The Mechanical Universe, the CPB/Annenberg Project is now developing a pilot for The Chemical World, a one-semester television course in introductory chemistry for non-science majors. Projects like this and the teacher guides accompanying it would also benefit from NSF support.

In Arizona and South Carolina, public television stations are providing graduate level technological, engineering and business administration courses. In Arizona, these courses are being used by IBM, Burr Brown, Hughes, Motorola and other electronics firms as well as the Army's electronics facility at Fort Huachaca and Sierra Vista. In South Carolina, 60 percent of the graduate degrees in business administration and engineering that are conferred by the University of South Carolina each year go to these telecasting students. This service helps our nation's workforce and servicemen and women improve their skills and fosters our nation's international industrial competitiveness as well.

With the steady support of NSF through the years, public television has provided high quality science programming that equally fascinates and educates its intended audience. Our audience response has shown us that we need to develop more regular series like NOVA that explore new technology and scientific innovation and more limited series like The Brain and The Search for Mind that explore specific scientific fields. The tremendous success of 3-2-1 Contact and our college courses has shown that more efforts in those areas can help conquer "science fear" in our nation's student body.

The critical assistance and guidance provided by the National Science Foundation's Science and Engineering Education Directorate will continue to be necessary to achieving those goals. We urge you to appropriate as much as you can for the work of the National Science Foundation and that NSF be encouraged to direct as much as they can to using our nationwide system of public television stations to help bring more science information and education to all Americans.

Thank you.

READING RAINBOW PROGRAM

Mr. BURTON. To begin again, my name is LeVar Burton. I am primarily an actor by profession. In that capacity, I have had the very good fortune, among other things, to be the host of Reading Rainbow.

I am here today to recommend funding for the National Science Foundation with regard to its support for the kind of activities in which we are involved at Reading Rainbow.

By the way, for the record and for background, Reading Rainbow is a nationally televised children's program on PBS designed to combat what the educators in this country call the summer loss phenomenon.

Children, when they leave school in May and have their 3-month break, generally, I guess that you could say that the last thing that a child wants to do on a summer vacation is to take a book and read.

Consequently, there is this loss phenomenon in terms of their reading and comprehension skills. We provide one-half hour of television each day during those summer months to encourage those kids to read good books. This is with the emphasis on the fun and adventure in reading as opposed to the drudgery. The idea here being that you can pick up a book and you can travel anywhere in the universe. We feature books as a source of entertainment as well as information.

The centerpiece of each show is an adaptation, an actual adaptation, of the feature selection itself. We use the camera that is moving over the still photographs, the original art and illustrations in the book itself and lending motion and fluidity to the otherwise static form. We then sweeten this adaptation with music and sound effects, voice-overs that are done by celebrities such as Bill Cosby, voice-over narrations for the show.

I am pleased to report that librarians, book sellers, and teachers have reported a stunning increase in requests for books that are featured on Reading Rainbow.

Book sales of Reading Rainbow titles have dramatically increased, ranging from 100 to 1,300 percent, indicating that the series has motivated children to read.

Librarians, in a recent survey, are convinced that the series has stimulated children's interest in reading. Three-fourths of them also thought that Reading Rainbow encouraged the parent's interest in their children's reading. This is specifically important to us because we feel that the process of a child becoming interested in reading must be supported and, in fact, motivated by the parent.

I, myself, was raised by an English teacher. She read not only to myself and my sisters as children, but she read in front of us. I think that is an important example of parents reading in front of their children. This is significant. They need to get the idea that reading is a normal and a healthy activity for human beings.

Independent marketing surveys have also shown that among children that watch Reading Rainbow their reading and their comprehension skills have improved anywhere from between 15 to 40 percent over that summer holiday.

NUMEROUS AWARDS CITED

In its 3-year history, Reading Rainbow has won numerous awards for outstanding children's programming, including the prime time Emmy award nomination and an award from the American Children's Television Festival and the prestige of an award from the International Film Television Festival of New York, a gold medal.

Now I am consistently amazed and encouraged by the popularity of the show. According to Neilson, by the end of our second season, we had an audience of 7.8 million viewers. That was with relatively modest promotional support. These ratings equal those of Mr. Rogers' Neighborhood and The Electric Company, two perennial and longstanding favorites on PBS, Mr. Chairman.

In its third season in the summer of 1985, Reading Rainbow met with equally enthusiastic responses from the teachers and librarians, and, especially, parents. But most of all, Reading Rainbow is loved by the children who watch it.

I know from my personal experience with young people how much they want to learn. I travel a lot in my job. I criss-cross the country about 6 months of the year. Kids constantly come up to me and tell me about their favorite shows and how much they love to read, which tells us just how effective we are in our work here.

Reading Rainbow is funded by the Corporation for Public Broadcasting, the Nation's public television stations, Dalton Bookseller Initiative, the Carnegie Corp., and the new addition to our list of funders, the National Science Foundation.

This year we embarked on something new. This is urging young people to read more about science. It is designed to demonstrate to children how science is integrated into all aspects of our lives.

PURPOSE OF SCIENCE SHOWS

The primary objectives in doing science shows on Reading Rainbow are threefold.

First, it is to stimulate children to become more involved in science-oriented activities and reading.

Second is to make science literature more visible to parents, librarians, and teachers in order to engage children's interest in reading science books and in making what seems as serious reading fun.

Third is to demonstrate to children's book publishers the potential market for science literature designed for children who have just learned to read.

To help us to achieve our objectives, the NFS has granted us $200,000 a year for the next 2 years. Reading Rainbow will be producing five programs dedicated to science; two will be premiered this summer; three will be featured next summer, Mr. Chairman.

This past March we were in California where we shot our two new science programs based on the book, "The Milk Makers," and another book called, "Germs Make Me Sick."

So "Milk Makers" is by Gail Gibbons. It was filmed in the San Jose area in California's dairy country. The book traces the process of the milk from the cow to the dairy.

I was taught to milk a cow by hand. If you have never had the experience, Senator, I highly recommend it. It is quite amazing.

I also got the opportunity to hook up a couple of cows to a milking machine introducing me to the way that milking is done in modern times.

We also toured a cheese-making factory to get a glimpse of the kind of necessary for baby calves.

"Milk Makers" illustrates a basic element of science. That is life cycles. We get our milk from cows who have just had babies. Those babies grow up. They have babies. We get our milk from them. So on and so on.

We also expose children to something that is very familiar to them. That being milk, whether it comes in the form of cheese or in an ice cream cone.

The book, "Germs Make Me Sick," by Melvin Berger examined what germs are, what they look like, how we catch them, and how our bodies might fight them.

We visited a microbiology lab and learned about how the scientists grow different kinds of microorganisms. I was personally amazed to see just how a seemingly innocuous microorganism like the one that causes bad breath could be so interesting to look at under the microscope with so foul a smell even from a great distance.

A visit to an organic farm illustrates to our viewers how microorganisms also keep, that is also help to keep our world alive.

"Germs Make Me Sick" helps children understand why they may get a cold or measles or a variety of illnesses that are familiar to children.

I would be happy to answer any questions that you might have, Senator, or even send you tapes so that you can see the show in its entirety. We hope that you will watch us this summer when we premiere on public television stations across the country beginning June 23.

Thank you, Senator.

Senator JOHNSTON. Thank you very much, Mr. Burton, for an excellent presentation.

Mr. BURTON. Thank you.

Senator JOHNSTON. I'm familiar with the program. I don't watch it regularly. It doesn't come on during the time span when I'm available to watch TV. I am a big fan of public television and of almost everything that is on there.

Your presentation was an excellent presentation. As a matter of fact, with talent like yours, you ought to go into the movies.

Mr. BURTON. It is a career that I have considered from time to time.

Senator JOHNSTON. Thank you very much.

Mr. BURTON. Thank you, Senator, for your time.

Senator JOHNSTON. Your full statement has been ordered in the record without objection.

Mr. BURTON. Thank you.

Senator JOHNSTON. Next we would like to welcome David Marker, president of Cornell College in Iowa, on behalf of the Great Lakes Colleges Association.

STATEMENT OF DAVID MARKER, PRESIDENT, CORNELL COLLEGE, IOWA, ON BEHALF OF THE GREAT LAKES COLLEGES ASSOCIATION

UNDERGRADUATE SCIENCE AND ENGINEERING EDUCATION

Mr. MARKER. Mr. Chairman, I want to thank you for the opportunity of appearing before this committee on behalf, not only of the Great Lakes College Association colleges, but also those colleges which are the Associated Colleges of the Midwest, Reed College in Oregon, and Connecticut College.

I have come here today to speak in favor of the $13 million increase in appropriations for undergraduate science and engineering education that's proposed by the National Science Foundation.

The projections in the report of the National Science Board Task Committee which was mentioned just a moment ago suggests that we aren't going to have enough scientists. We are not going to have enough teachers of science. We are not going to have enough technicians and engineers to maintain the level of scientific expertise in this country if we are to continue our scientific and technological excellence. We are not going to have enough scientists to maintain this Nation's security unless we do something especially to shore up the undergraduate science education.

Now why is it important to do something about undergraduate science education? Scientific careers are frequently chosen during the undergraduate years.

In the finest educational programs, especially at the undergraduate level, science is learned by doing science. It is not uncommon for students at our institutions to leave the college to go on to graduate or professional schools, to go on to industrial research, having participated in the design of research, doing research, and in publishing research with the faculty mentors.

We are pleased to endorse the approach set forth for fiscal year 1987 by the Foundation which intends that undergraduate research participation will be strengthened and expanded, that there will be an imaginative approach for faculty development and instructional equipment support will be increased, Mr. Chairman.

We've produced a lot of results in undergraduate research participation. That is one of the reasons that I come to you today on behalf of our colleges to urge the further support of it.

URP PROGRAM

In the URP Program that the Foundation supported from 1957 to 1981, in our colleges we had approximately 1,000 such students who participated in that program. About 60 percent of those students went on to a career in science as a result of their participation in it. About 93 percent of those students hold advance degrees either in sciences, the physical sciences, the medical sciences, and related fields. The URP Program, which was discontinued unfortunately, and I think it was a matter of fixing something that wasn't broken, this was extremely effective. We made good use of it in producing the scientific personnel for this country.

I know that there is the belief that one cannot do cutting-edge important science in our kind of institutions; that is, predominantly undergraduate colleges. The record shows impressive evidence to the contrary.

Last summer there was a conference at Oberlin College which brought together 48 good liberal arts colleges with a strong record in science productivity. It was noted that of the approximately 7,000 journal articles in the past 5 years done by about 1,400 science faculty at those 48 colleges, that, of those, one-third of those were coauthored with undergraduates. So research for teaching and learning research for the production of people who have gone on to careers in science were those which our country needs.

Senator JOHNSTON. Let me ask you this.

Mr. MARKER. Yes.

Senator JOHNSTON. This program is not limited to the Greak Lakes Colleges Association, is it?

Mr. MARKER. No, sir.

Senator JOHNSTON. It is a nationwide program there, Mr. Marker?

Mr. MARKER. That is correct. We are especially interested here because of our excellent experience with it in the past. We have seen lots of results from it.

Senator JOHNSTON. The total amount that you are seeking is how much?

Mr. MARKER. We are supporting the NSF.

Senator JOHNSTON. I mean how much for the NSF?

Mr. MARKER. A $14 million increase over the $50 million being spent this year.

Senator JOHNSTON. Well, let me say that I very strongly support your kind of initiative.

Mr. MARKER. Thank you.

NEED TO PLAY CATCH-UP BALL

Senator JOHNSTON. As a matter of fact, we had an amendment on the floor yesterday that put billions of dollars or allowed billions of dollars for educational initiatives. In general, we got about 35 votes. But you are entirely correct. We need more money in the sciences especially. We are losing our advantage. We used to have quite an advantage in the sciences in education in general. We don't have that any more. We had better start to play catch-up ball. I am afraid that we are just getting more and more behind.

Mr. MARKER. Right. The National Science Board's report which was recently published in March suggests that much more than $13 million would be needed over the next several fiscal years if we are to play catch-up ball, as you suggest. I think this is very much needed.

Senator JOHNSTON. Yes. I quite agree. We will do what we can, those of us that support your point of view on the sciences.

Mr. MARKER. I might add this.

Senator JOHNSTON. Yes.

Mr. MARKER. We support the cause for instrumentation at our colleges and for faculty development, which is necessary for teaching, learning, and research as well.

Again, I want to emphasize that we have produced impressive results in our colleges in the past number of years. For a relatively modest amount of money we would like to help play catch-up ball.

Senator JOHNSTON. I believe that.

Mr. MARKER. Yes.

Senator JOHNSTON. You might read Lester Thoreau's new book on the zero sum solution talking about how the United States is falling behind our competitors. Our competitor is really not the Soviet Union, but Germany, Japan, Sweden, et cetera, how they are making leaps above us in productivity and education. It is what they are doing and what we are not doing, and what we need to do in that respect. That is right down your alley. He is asking for much more than you are asking.

Mr. MARKER. Thank you.

[The statement follows:]

STATEMENT OF DAVID MARKER, PRESIDENT, CORNELL COLLEGE, IOWA, ON BEHALF OF THE GREAT LAKES COLLEGE ASSOCIATION, ASSOCIATED COLLEGES OF THE MIDWEST, REED COLLEGE, AND CONNECTICUT COLLEGE

I am David Marker, President of Cornell College of Iowa. I am pleased to have been invited to testify before this subcommittee as you consider the fiscal year 1987 appropriation for the National Science Foundation. In appearing here today, I am representing the twenty-five undergraduate liberal arts colleges which comprise the Associated Colleges of the Midwest (ACM) and the Great Lakes Colleges Association (GLCA)*. Reed College in Oregon and Connecticut College also join in supporting our position.

Historically the National Science Foundation has had a dual mandate, both to support the most promising basic research and also to provide for our future scientific capacity through the support of science education at the undergraduate and precollege levels. Our national security and our economic preeminence rest on our continued excellence, both in current research and in the development of an adequate number of scientists, teachers of science and technicians for the future. After serious and dangerous neglect the National Science Foundation has renewed its commitment to this second part of its mission, "the development of properly educated and trained people, the human resources pool that provides the scientists and engineers for the future," as NSF Director Erich Bloch aptly put it in introducing the Foundation's budget proposal for fiscal year 1987.

We enthusiastically endorse the recommendations of the National Science Board's Task Committee on Undergraduate Science and Engineering Education released in March. We quote from the Executive Summary of the final report:

> The following items list the program areas of highest priority and indicate the distribution of funds appropriate to their complementary and interactive character.
>
> o Laboratory Development------------------------------$20 million
>
> (supporting development projects to improve the laboratory component of science and engineering instruction)

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*The members of GLCA are DePauw, Earlham and Wabash in Indiana; Albion, Hope and Kalamazoo in Michigan; and Antioch, Denison, Kenyon, Oberlin, Ohio Wesleyan and the College of Wooster in Ohio. Members of ACM include Colorado College; Knox, Lake Forest and Monmouth in Illinois; Coe, Cornell and Grinnell in Iowa; Carleton, Macalester and St. Olaf in Minnesota; and Beloit, Lawrence and Ripon in Wisconsin.

- Instructional Instrumentation and Equipment--------$30 million

  (encouraging and supporting joint efforts to remedy the serious deficiencies of instructional instrumentation and equipment)

- Faculty Professional Enhancement-------------------$13 million

  (stimulating new ways and sharing the support of the best new and traditional ways of improving the professional qualifications of college and university faculty members)

- Course and Curriculum Development------------------$13 million

  (encouraging and supporting efforts to improve the ways in which technical knowledge is selected, organized, and presented)

- Comprehensive Improvement Projects-----------------$10 million

  (addressing several of the above priorities simultaneously in a single institution, or across a given discipline, or in a combination of these through consortial efforts)

- Undergraduate Research Participation---------------$ 8 million

  (stimulating and supporting the involvement of advanced undergraduate students in research in their colleges and in other places with programs of technical investigation)

- Minority Institutions Program----------------------$ 5 million

  (strengthening the capability of minority institutions to increase the participation of minorities in professional science, mathematics, and engineering)

- Information for Long-Range Planning----------------$ 1 million

  (collecting, studying, and analyzing information and data on undergraduate education in science, engineering, and mathematics, to assist long-range Foundation planning; this funding should include an appropriate level of collaborative work with the Department of Education and other major data sources)

This increase of $100 million, although insufficient to solve all of the problems of undergraduate science, engineering and mathematics education in the United States, can cause truly significant, positive changes. In constant dollars, the proposed programming is not far short of the level of the Foundation's undergraduate activities in the late 1960s. Review of these programs indicated that many of them had strong, positive influence on the quality of undergraduate education, and that experience provides assurance that this proposed level of activity can be effective.

Scientific careers are frequently chosen -- or not chosen -- during undergraduate years. Early mentors influence the lives of aspiring scientists in these years and make indelible impressions; very often they inspire students to enter a specific field of scientific research and/or the teaching of science. In the finest educational programs -- even at the undergraduate level -- science is best learned by doing science. At our colleges many students have the opportunity to work with a Ph.D. research scientist-teacher in a research laboratory in which "real" science is being done. The insights into the scientific enterprise which result are far more realistic than those produced solely through the use of textbooks, sample problems and "cookbook" (contrived) experiments. It is not uncommon for our students to go to graduate and professional schools with first-hand knowledge of what it really means to do science derived from participation in every phase of scientific work from research design to the publication of the results in refereed scientific journals.

Our colleges are pleased that NSF has proposed for fiscal 1987 an increase of $13 million over a base of nearly $50 million to support research and educational activities at predominantly undergraduate institutions. We further endorse the planned three-pronged approach set forth in the budget summary which intends that:

- o Undergraduate research participation will be expanded and strengthened;
- o Imaginative approaches to individual faculty development will be encouraged; and
- o Instructional equipment support will be increased.

Undergraduate Research Participation

Primarily because of our long and positive experience with NSF's now-discontinued Undergraduate Research Participation (URP) program, the expansion and strengthening of undergraduate research participation is a top priority for our colleges.

To document the importance of undergraduate research participation in our colleges, the ACM and GLCA conducted a survey of our students who participated in the URP program. This program for each summer from 1957 to 1981 provided students with the opportunity to work closely with a faculty advisor in an intensive research project. The program supported projects in several fields, including anthropology, biology, chemistry, economics, geology, mathematics, physics, political science and psychology. The survey instrument designed to gather information about the URP program and its impact on the students' undergraduate and graduate experience, as well as career choice, was sent to nearly 900 former students. The preliminary results from 439 responses show that 59.2% of the former students acknowledge that their current careers were influenced by

URP participation: 92.7% hold advanced degrees (20.5% hold masters, 21% M.D. degrees and 46% earned doctoral degrees); 30.3% work in academe, 33.7% in industry, 20.3% in medicine and 6% in government. Within these fields, 63.8% are involved mainly in teaching and/or research.

The comments made about URP were wide-ranging. Many reported that the URP project was the first opportunity to "spend extensive time on one single goal-directed project" and to discover what research was really like through involvement with faculty members and other participants. This experience provided an "edge" in graduate school through the tools of research learned during the URP project. The URP program provided the enthusiasm and encouragement needed by many to remain in science fields.

We will provide the results of this survey to Congress and the NSF as a part of the case for further support of undergraduate science. The URP program in the long run was an excellent way to further American science education and research and realized the objectives of one of the "prongs" proposed by NSF for fiscal 1987.

It is a belief of some that research done in a purely undergraduate setting is not "cutting edge" work. There is impressive evidence to the contrary, however. In background materials done for a conference held at Oberlin College last summer, which brought together 48 good liberal arts colleges with a strong record in science productivity, it was noted that of the approximately 7,000 journal articles in the past five years by about 1400 science faculty at those teaching institutions, one-third had been co-authored with undergraduates. (See Appendix A.)

Undergraduate Faculty Development and Research

Activities mentioned by Mr. Bloch such as "research sabbaticals, participation in industrial research, special short courses and workshops" will supplement opportunities now available to our faculty and will be the primary means of development for some of them. "Other approaches, such as building enduring partnerships between a four-year college and a university research organization or industrial laboratory" will not only provide diversity, but will also supply the human and instrumentation resources which will never be available on our campuses because of cost or scale of operation. We are pleased to see that this endeavor will begin in fiscal 1987 and, we hope, be expanded appropriately as the NSB Task Committee recommends under Faculty Professional Development and Comprehensive Improvement Projects headings.

Instructional and Research Equipment

Much of the instrumentation acquired through earlier support of NSF, around which teaching programs in our institutions have been designed and built, is outmoded. The recently established College Science Instrumentation Program (CSIP) makes it possible to acquire modern equipment. For instance, instruments which incorporate computers in data acquisition and analysis give students experience in up-to-date techniques.

The impact of the instructional equipment program is far out of proportion to the modest investment of funds by NSF because it requires a match from the grantee institution. Typically, equipment purchased through this program is used in student-faculty research, in more traditional laboratory exercises and in the ongoing research of faculty. This means that even in doing more traditional laboratory exercises, undergraduates in our colleges have access to "state of the art" laboratory instruments. Hence the benefits of dollars for instrumentation are multiplied in undergraduate colleges in a manner not possible, or at least not practiced, in other institutions.

The $2 million increase for CSIP in fiscal 1987, which raises the program's budget to approximately $7.5 million, is a step in the right direction although the recommendation of the NSB Task Committee for $30 million in fiscal 1988 more realistically addresses the need. Given the number of competing institutions, we urge that the 1987 competition for these funds remain completely open. Mr. Bloch's proposed $3 million "set aside" for engineering departments in undergraduate- and Ph.D.-granting institutions would leave less for awards to undergraduate institutions than in either of the program's first two years.

It has been possible to acquire research instrumentation through the Research in Undergraduate Institutions (RUI) Program. Support which enables acquisition of "state of the art" instrumentation has been one of the most valuable products of this program and we certainly hope it will be sustained.

Faculty Research in Undergraduate Institutions

There has been a reluctance on the part of some of our scientists to apply for grants under the Research in Undergraduate Instititutions program. Among those with reservations are researchers who have been successful applicants for NSF research grants earlier, not just novitiates. There is the perception within our faculties that they are at a disadvantage in obtaining research support because of their undergraduate institutional base. It cannot be overemphasized that the record clearly demonstrates that significant research can go on in our colleges. We hope that the NSF will take affirmative steps to inform our scientists that it welcomes proposals from them with their understanding that RUI is a highly competitive program. One way to allay those negative feelings on undergraduate campuses would be to send the staff of NSF research directorates to regional briefings of these faculty.

There have been some problems in the realization of the Small College Faculty Research Opportunity Awards (ROA) because of the highly decentralized nature of this program's administration across the research directorates. Would-be ROA applicants do not have ready access to a list of NSF grantees with whom they could work because NSF no longer issues its annual Grants and Awards publication. The conditions and terms of ROA grants are not clearly stated by all directorates and vary significantly. This situation breeds great confusion among applicants. We hope this committee will join us in pressing NSF leadership for accountability and uniformity in administering the ROA program. It would be very helpful to have uniform guidelines from the research divisions and to publish a list of NSF grantees for potential ROA applicants.

Program Administration

We urge that careful consideration be given to the administration of the various programs proposed for undergraduate institutions. These programs are oriented toward both education and research. Which directorates -- that for science and engineering education or those for research -- will most effectively and efficiently enable the realization of each of the proposed programs is not clear at this time. Our experience is that the College Science Instrumentation Program is well-administered by the science education directorate and should remain there. Our faculty felt that the former Two- and Four-Year College Research Instrumentation Program, administered from a research directorate, was exemplary but only after it had its own administrator and its own review panels.

We are delighted that the NSB's Task Committee and the National Science Foundation have given renewed attention to issues of undergraduate science to bring about important and overdue changes in emphasis and priority for our Federal science policies.

Thank you for this opportunity to speak on a subject so important to us.

Appendix A

II. Scholarly Activity of the Science Faculty by Discipline :
Journal Articles and Conference Papers,
The 48 Liberal Arts Colleges,
1979-80 through 1983-84

A: Journal Articles

				Numbers of Journal Articles						
Discipline	Headcount Faculty*	N of Fac. Publish.**	% Publish.	Sole Author	Co-author w/ Faclty	Co-author w/ Studnt	Co-author w/ Stu & Fac	Total Articles	Articles per Fac.	% Student Co-Author
Biology	551	396	71.9%	555	901	494	193	2,144	5.41	32.1%
Chemistry	561	326	58.2%	229	658	539	202	1,628	4.99	45.5%
Geology	180	132	73.3%	268	265	55	25	613	4.64	13.1%
Mathematics	602	277	46.0%	569	325	32	5	931	3.36	4.0%
Physics	387	192	49.6%	335	407	112	73	1,007	5.24	18.4%
Other Sciences	184	104	56.7%	211	258	122	48	639	6.13	26.6%
Science Totals :	2,465	1,428	57.9%	2,167	2,894	1,353	546	6,961	4.87	27.3%

B: Conference Papers

				Numbers of Conference Papers						
Discipline	Headcount Faculty*	N of Fac. Publish.**	% Publish.	Sole Author	Co-author w/ Faclty	Co-author w/ Studnt	Co-author w/ Stu & Fac	Total Papers	Papers per Fac.	% Student Co-Author
Biology	551	347	63.0%	696	395	227	109	1,427	4.11	23.5%
Chemistry	561	202	36.0%	493	227	203	35	959	4.75	24.9%
Geology	180	126	69.0%	296	168	71	13	548	4.36	15.2%
Mathematics	602	225	37.4%	529	95	10	9	643	2.85	2.9%
Physics	387	155	40.2%	212	240	58	68	577	3.72	21.8%
Other Sciences	184	84	45.9%	209	70	26	19	324	3.84	13.9%
Science Totals :	2,465	1,140	46.2%	2,436	1,195	595	252	4,478	3.93	18.9%

* Headcount of persons having held teaching faculty status, 1979-80 through 1983-84
** Headcount of such faculty having published at least one item of the type examined

Source: "Educating America's Scientists: The Role of the Research Colleges," a paper prepared for the Conference on "The Future of Science at Liberal Arts Colleges," held at Oberlin College, Oberlin, Ohio, June 9-10, 1985, page 46.

II. Scholarly Activity of the Science Faculty by Discipline :
Books and Literature Reviews Published,
The 48 Liberal Arts Colleges,
1979-80 through 1983-84

C: Books Published

Discipline	Headcount Faculty*	N of Fac. Publish.**	% Publish.	Numbers of Books Published: Sole Author	Co-author w/ Faclty	Co-author w/ Studnt	Co-author w/ Stu & Fac	Total Books	Books per Fac.	% Student Co-Author
Biology	551	43	7.7%	21	40	0	0	60	1.42	.0
Chemistry	561	38	6.8%	48	49	0	0	97	2.54	.0
Geology	180	32	17.5%	16	22	1	0	40	1.26	3.4%
Mathematics	602	48	8.0%	40	26	0	4	70	1.46	5.9%
Physics	387	19	5.0%	30	12	0	0	43	2.21	.0
Other Sciences	184	22	11.9%	25	14	3	0	41	1.88	6.7%
Science Totals :	2,465	202	8.2%	180	163	4	4	351	1.74	2.3%

D: Literature Reviews

Discipline	Headcount Faculty*	N of Fac. Publish.**	% Publish.	Numbers of Literature Reviews: Sole Author	Co-author w/ Faclty	Co-author w/ Studnt	Co-author w/ Stu & Fac	Total Reviews	Reviews per Fac.	% Student Co-Author
Biology	551	219	39.7%	555	75	32	20	681	3.11	7.5%
Chemistry	561	116	20.6%	455	32	20	12	518	4.48	6.1%
Geology	180	70	38.7%	246	37	15	3	302	4.33	6.2%
Mathematics	602	177	29.5%	1,056	19	1	3	1,079	6.08	.4%
Physics	387	117	30.3%	497	53	5	2	555	4.74	1.1%
Other Sciences	184	80	43.5%	328	29	54	3	414	5.18	13.9%
Science Totals :	2,465	779	31.6%	3,136	244	127	42	3,549	4.56	4.8%

* Headcount of persons having held teaching faculty status, 1979-80 through 1983-84
** Headcount of such faculty having published at least one item of the type examined

Source: "Educating America's Scientists: The Role of the Research Colleges," a paper prepared for the Conference on "The Future of Science at Liberal Arts Colleges," held at Oberlin College, Oberlin, Ohio, June 9-10, 1985, page 47.

Senator JOHNSTON. Next we would like to welcome Dr. Judson M. Harper, vice president for research at Colorado State University.

[No response.]

Senator JOHNSTON. Is Dr. Harper here?

[No response.]

Senator JOHNSTON. In Dr. Harper's absence, we then welcome Mr. D. James Baker, president, Joint Oceanographic Institutions, Inc., and Dr. John L. Kermond, assistant director, Federal relations, NASULGC. They are on behalf of—well, he is on behalf of the National Association of State Universities and Land-Grant Colleges.

STATEMENTS OF:

D. JAMES BAKER, PRESIDENT, JOINT OCEANOGRAPHIC INSTITUTIONS, INC.

JOHN L. KERMOND, ASSISTANT DIRECTOR, FEDERAL RELATIONS, NATIONAL ASSOCIATION OF STATE UNIVERSITIES AND LAND-GRANT COLLEGES

Mr. BAKER. Thank you, Mr. Chairman.

Senator JOHNSTON. I am sure that I am supposed to know what NASULGC is, but I don't. Maybe you could tell me, Mr. Baker.

Mr. BAKER. It is the National Association of State Universities and Land-Grant Colleges.

Senator Johnson. I did know that, too. Thank you, Mr. Baker.

Mr. BAKER. I'm James Baker, president of the Joint Oceanographic Institutions, Inc. This testimony is presented on behalf of myself, joint testimony, and John Kermond from the National Association of State Universities and Land-Grant Colleges. I will give the testimony. We will both be available for questions.

This statement is presented on behalf of the marine division of the National Association of State Universities and Land-Grant Colleges and the members of the Joint Oceanographic Institutions, Inc.

Together we represent essentially all of the marine academic community. We appreciate the opportunity to provide a statement on the fiscal year 1987 budget request for the National Science Foundation.

Senator JOHNSTON. Your full statement will be put into the record. If you could summarize it, we could have a chance for some dialogue that would be more meaningful.

STATEMENT SUMMARIZED

Mr. BAKER. We will do that. We strongly support the National Science Foundation's budget request for 1987, in particular the biotechnology area and the global geosciences initiative and, in particular, the Ocean Science Division request and complimentary request from NASA. We believe even in times of budget stringency it is critical to support basic research. We believe this is critical. Research is a long-term investment and this allows us to reap an economic harvest that could be the envy of the rest of the world.

Now this is what has given the American public the life style and well-being that it enjoys.

There is a 23-percent increase sought in the biotechnology area. It is applauded. It is from $86.5 million to $106.5 million.

Marine biotechnology specifically offers enormous opportunity for innovation and breakthrough which will shorten the time gap between the laboratory and the market place. This will provide the private sector with the necessary ingredients to stimulate and expand the overall economic return on Federal investment.

GLOBAL GEOSCIENCES

Global geosciences is a new initiative to study the Earth as an integrated system. The emphasis will support the study of Earth as an integrated system of physical, chemical and biological processes using a variety of new tools and technology and techniques.

Now such research is of the highest priority. Rarely has there been an opportunity like this to apply technological breakthroughs such as satellite technology, new highly precise chemical detection techniques, and high-speed computers for the interpretation and enhancement of global data to such vital problems.

One striking example of the need for study of the Earth as a system is the fact that every year people are endangered and that billions of dollars are lost because of inadequate long-term weather and climate prediction.

The 1982–83 El Nino was a dramatic example. Today we know that the interaction of the ocean and the atmosphere is the cause of much of the long-term variability of weather and climate.

The floods in California this year have been linked to events in the North Pacific Ocean.

We need a global geosciences program and associated satellite measurements from NASA's TOPEX and others so that we can improve the predictions of weather and climate. Even a modest increase in the accuracy of the forecasts would have an enormous impact, not only on coastal regions, but also in the Midwest where farm yields depend critically on the weather and climate.

OCEAN CURRENTS

Senator JOHNSTON. Are you close to being able to relate ocean currents? I know that they interact. But do you know how they interact and your being able to put that on a computer and predict when El Nino comes and goes?

Mr. BAKER. We are close to being able to predict the El Nino. We have the tools to observe and we have computers. We are just now getting the computers on line to take that data, Senator.

Senator JOHNSTON. Yes.

Mr. BAKER. So I think that the exciting thing about this is that we now see that we have the tools. We have some ideas about how the system works and we are close to being able to do that kind of prediction.

We see that this represents very exciting science. We would like to draw your attention to the document that we would like entered into the record in its entirety.

Senator JOHNSTON. Yes.

Mr. BAKER. "Ocean and Marine Resources—Research Priorities and Initiatives." It is this document. It supports the geoscience initiative and it reflects accurately a consensus of the marine academic community that the NSF budget allocation is sound and that their strategy is well chosen, Mr. Chairman.

So, with a program so agreeable to scientists and to the administration, including OMB, the Office of Science and Technology Policy, and the White House Science Council, we now look to the expert guidance and support of the Congress, to, particularly, your continued leadership, to make sure that the NSF appropriation for 1987 is at the President's request.

Thank you for the opportunity to present our views on this.

Senator JOHNSTON. Thank you very much for your testimony.

I happen to think, as did the last witness, that these programs are on the cutting edge of our knowledge and they ought to be supported as compared to the strategic defense initiative, as they are very cheap. I think that they will do a lot more for, if not national security, then the national well-being than some of those more expensive programs. I really think that we should pursue them. I hope that we will be able to find the money in the days of Gramm-Rudman to be able to support them.

CHEMICAL DETECTION PROGRAMS

You talked about those chemical processes, the chemical detection programs.

Mr. BAKER. Yes.

Senator JOHNSTON. What is that?

Mr. BAKER. Senator, we know that carbon dioxide is increasing in the atmosphere. We know that the effect of carbon dioxide is to cause the Earth to warm. We don't know exactly how it is going to happen, but we think that is happening.

In the past few years we have developed chemical detection techniques that can detect other gases in the atmosphere; for example, methane and other organic gases that are emitted by mankind. The sum of those gases is equal to the effect of carbon dioxide. We now have chemical techniques for this, Senator.

Senator JOHNSTON. Your chemical detection, that is on the Hawaii observation platform?

Mr. BAKER. Right.

Senator JOHNSTON. You do that observation?

Mr. BAKER. Yes; we do that. We also have a new satellite that is being proposed by NASA that was approved last year that is called the upper atmosphere research satellite. That will measure chemical constituents in the atmosphere, Senator.

Senator JOHNSTON. Are you the one that is studying the floral carbon effect up there in the north? I guess it is in Antarctica where the ozone layers are?

Mr. BAKER. Yes.

Senator JOHNSTON. Is that your work?

Mr. BAKER. Yes; we are involved with that. In fact, that is an interesting problem. One thing that we have learned is that the chemical interactions that take place in the atmosphere are influenced not only by what happens in the atmosphere, but also by what happens on land and in the ocean. There is a transfer of the gases between the leaves and the soil, as well as the plants and plankton in the ocean.

Senator JOHNSTON. How do they measure that ozone layer depletion?

Mr. BAKER. It's a direct measurement of the radiation in the atmosphere. Some radiation is absorbed by the ozone and some other isn't. If you look at the different wave lengths, you can determine this.

Senator JOHNSTON. They don't have the data to compare that to in past years, do they?

Mr. BAKER. That is one of the problems, which is trying to collect the long-term data. With the techniques that we have now, we could start to do that.

Senator JOHNSTON. Then can you say whether or not that phenomenon has existed in the past years or not?

Mr. BAKER. We have a dim picture of fluctuations that are in that, but we don't have the data to go back and see whether there has been such a big change that we had just recently observed.

Senator JOHNSTON. Thank you very much.

Mr. BAKER. Thank you.

Senator JOHNSTON. Thank you very much for that very good testimony. Your full statement is included in the record without objection.

Mr. BAKER. Thank you.

[The joint statement follows:]

JOINT STATEMENT OF DR. J.L. KERMOND, NATIONAL ASSOCIATION OF STATE AND LAND-GRANT COLLEGES (MARINE DIVISION), AND DR. D. JAMES BAKER, JOINT OCEANOGRAPHIC INSTITUTIONS, INC.

This statement is presented on behalf of the Marine Division of NASULGC, and the members of the Joint Oceanographic Institutions, Inc. Together we represent essentially all of the marine academic community. We appreciate the opportunity to provide the following statement on the FY87 Budget request for the National Science Foundation, and in particular to strongly support the budget for the Ocean Sciences Division of NSF.

OVERALL NSF BUDGET REQUEST

It is a distinct pleasure to speak in full support of the NSF component of the President's budget request.

It is worthwhile at this point to take a serious "anatomical" cross-cut of the President's entire budget request. The major policy assumptions for the Federal establishment, including NSF, were: no tax increase; high priority programs adequately funded; unnecessary programs no longer affordable; the government should not compete with the private sector; many services can be provided better by state and local governments; remaining federal activities should be better managed; and, 'reform' of the budget process. These policy assumptions were the basis for the subsequent priority initiatives in the budget: national defense, security assistance, law and drug enforcement, and, amongst others, **basic research.**

With the above as a foundation, we wish to join with the President's Office of Management and Budget, and the Office of Science and Technology Policy, in support of the NSF budget request. Our member institutions, the nation's universities, have long played an important role in the basic research enterprise of this country. The House Science and Technology committee claim that from the initial commitment of $33.5 million in 1945, the federal budget for basic research has grown to the order of around $10 billion today. With the matching commitment of states, and the continued partnership of government, industry and academia, this long-term investment will continue to reap the economic harvest that is the envy of the rest of the world, and is what has given the American public the lifestyle and well-being that it enjoys. The American system for training present and future generations of scientific and engineering talent is also of world envy, and the work of the National Science Foundation in this regard is above reproach.

Presently, more than half of all federal basic research programs are carried out in universities and colleges. NSF accounts for 25 percent of total federal basic research funding in universities. The bond forged between education and research is itself the unique strength of academic science and engineering.

The NSF has carefully prioritized the FY87 request. The $1,685.7 million request (an increase of about 7% over FY85 in constant dollars) contains the following priorities: a strengthening of economic competitiveness through expanded Engineering Research Centers; an improvement in laboratory infrastructure and instrumentation; increased investment in Science and Engineering personnel; a continued leveraging of federal funds; and, special emphases in areas where the potential pay-off is great, where the private sector cannot afford the initial investment or risk, and where the U.S. clearly needs to maintain and strengthen its technological lead.

With respect to these special emphases, we wish to briefly highlight two-- Biotechnology, and Global Geosciences, prior to a broader discussion of the latter in the context of the Astronomical, Atmospheric, Earth and Ocean Sciences (AAEO) budget within NSF.

The 23% increase sought in the biotechnology area is applauded (from $86.5 million to $106.5 million). NSF propose to establish multidisciplinary research centers, and to give priority to individual investigator awards in the many facets of biotechnology research. Marine biotechnology, specifically, offers enormous opportunity for innovation and breakthrough which will shorten the time gap between the laboratory and the market place, and will provide the private sector with the necessary ingredients to both stimulate and expand the overall economic return on the federal investment.

Global geosciences is a new initiative to study the earth as an integrated system. The program is focused in the Directorates for Astronomical, Atmospheric, Earth, and Ocean Sciences and for Biological, Behavioral, and Social Sciences (BBS); the total budget request for FY 1987 is $18.28M. This incremental request of $16.28M for AAEO and $2M for BBS builds on a base of $16.6M, all in AAEO. This emphasis will support the study of earth as an integrated system of physical, chemical, and biological processes using a variety of new tools and techniques. Rarely has there been such agreement among scientists from all disciplines that such research is of the highest priority; rarely has there been an opportunity like this to apply technological breakthroughs such as satellite technology, new highly precise chemical detection techniques, and high-speed computers for interpretation and enhancement of global data to such vital problems.

Mr. Chairman, the above represents very exciting science, and this same "cutting edge" is reflected throughout the AAEO budget request of the NSF. Before our discussion of this budget aspect, we would like to draw your attention, and that of the subcommittee, to the document (that we would like entered into the record in its entirety) "Ocean and Marine Resources: Research Priorities & Initiatives" that supports the geoscience initiative and reflects accurately the consensus of the marine academic community that the NSF budget allocation is a sound one, and that their strategy is well chosen.

ASTRONOMICAL, ATMOSPHERIC, EARTH AND OCEAN SCIENCES (AAEO)

As the NSF Director, Mr. Eric Bloch, testified before you earlier this year, the FY87 budget request for AAEO of $383.2 million is an increase of $36.8 million over the post Gramm-Rudman-Hollings FY86 budget of $346.4 million. The majority of the increase is devoted to two new emphases -- global geosciences and computational science and engineering. Global geosciences is a program to describe and understand quantitatively the interactive physical, chemical, and biological processes that regulate the total earth system, the unique environment it provides for life, the changes that are occurring in that system, and the manner in which they are influenced by human actions.

The major component of global geosciences is a study of Global Ocean Climate (budgeted amount $8.6 million) aimed at better understanding of the role of the oceans in climate. This includes general circulation and heat transfer in the oceans, seasonal and interannual variability on a global scale, and prediction of oceanic response and feedback to long-term changes in the atmosphere.

Two major projects that will receive support through global geosciences are the World Ocean Circulation Experiment (WOCE) and the study of the interannual variability of the Tropical Ocean and Global Atmosphere (TOGA). These projects are being planned under the auspices of the international World Climate Research Program. In addition to the need for NSF support for field experiments, the projects require global satellite measurements of the ocean, atmosphere, and land. Operational measurements of the atmosphere are being provided by NOAA satellite initiatives from other agencies including NASA (TOPEX -- the Ocean Topography Experiment) for ocean circulation and upper atmospheric chemistry (UARS -- the Upper Atmosphere Research Satellite), and the Navy's Remote Ocean Sensing System (NROSS) for ocean properties and surface winds. NROSS and UARS are currently approved new starts, and TOPEX has been proposed as a new start for FY 1987.

One striking example of the need for study of the earth as a system is the fact that every year people are endangered and billions of dollars are lost because of inadequate long-term weather and climate prediction. The 1982-1983 El Nino was a dramatic example. Today we know that the interaction of the ocean with the atmosphere is the cause of much of the long-term variability of the weather and climate. The floods in California this year have been linked to anomalous warming and cooling in the North Pacific Ocean. We need the global geosciences program and the associated satellite measurements from TOPEX, NROSS, and UARS so that we can improve the predictions of weather and climate. Even a modest increase in the accuracy of forecasts would have an enormous impact, not only on coastal regions, but also in the midwest, where farm yields depend critically on weather and climate.

But global geosciences is not aimed solely at the El Nino. The so-called "greenhouse" warming of increased CO2, acid deposition, deforestation, desertification, earthquakes and volcanoes -- all of these have a profound effect on the public welfare and economic health of all nations. All of these examples demand better understanding if we are to manage human activities in a manner consistent with maintaining the integrity of our global life support system.

In recent testimony, Professor Thomas Malone has pointed out that in a broad sense the financial support proposed for global geosciences is a vital down payment on an investment we need to make towards a positive approach to the fate of the earth as we move into the 21st century.

In terms of emphasis, global geosciences also focuses on global tropospheric chemistry, the study of processes by which chemical substances enter the atmosphere, undergo transformations, are transported by wind systems, and are ultimately removed from the atmosphere. This will include study of complex interactions among chemical systems in the atmosphere, oceans, land, and biosphere. The overall program also includes a major emphasis on biology with its global ecosystem dynamics and global ocean flux programs. The former will address the role of terrestrial and fresh-water biosphere in an integrated earth system, including both tropical and high latitude ecosystems. The latter will seek to understand the physical, chemical, and biological processes controlling biogeochemical cycling in oceans and between the atmosphere, ocean, and sea floor.

Global geosciences also seeks to understand processes of the solid earth and their interaction with the rest of the earth system. Oceanic ridge crest processes examines interrelated geological, chemical, and specialized biological systems at mid-ocean seafloor spreading centers, a major component of the plate tectonic system that creates and modifies the earth's surface. Solid earth studies will include the use of global digital seismic networks for high-resolution of the earth's interior for study of convective motions; and satellites will be used for measuring crustal motions and analyzing global geology.

A final note: global geosciences, as well as other new programs in science and technology, will require an effective, internationally accessible, date management and information system. Prototypes are being developed by several agencies, including NSF, NASA, and NOAA. An immediate interaction will be required between global geosciences and the proposed NSF effort in computational science and engineering for help in this development.

This new program points the way to a science of the future which is becoming increasingly interdisciplinary and highly technology dependent. The various communities of scientists are already gathering together to plan the new programs. It is essential for the future health of the planet that we provide the necessary resources for this planning and for the new programs such as global geosciences as they emerge.

In conclusion, Mr. Chairman, we would like this opportunity to praise the NSF Director, Eric Bloch, for his courage of conviction and deep sense of commitment to the American scientific enterprise. Mr. Bloch has repeatedly highlighted the vital role of the nation's universities in basic research -- a tenet in which we hold a vested share ! The Foundation has clearly recognized that even in difficult budget times we cannot afford to reduce our investment in academic science and engineering.

With the NSF program direction so agreeable to scientists, to the Administration, including OMB, OSTP, and the White House Science Council, we now call on the expert guidance, support, and encouragement of the Congress, and particularly your continued leadership, to make certain that the NSF appropriation for FY87 is at the President's request.

We thank the Committee for this opportunity to present our views on the NSF Budget.

STATEMENT OF DR. JUDSON M. HARPER, VICE PRESIDENT FOR RESEARCH, COLORADO STATE UNIVERSITY

Senator JOHNSTON. Next we would like to welcome Dr. Judson M. Harper. Is Dr. Harper here?

Dr. HARPER. Yes.

Senator JOHNSTON. He is vice president for research, Colorado State University.

Dr. HARPER. Thank you, Senator.

Senator JOHNSTON. That is in Golden, isn't it?

Dr. HARPER. Fort Collins.

Senator JOHNSTON. Is it?

Dr. HARPER. Yes.

Senator JOHNSTON. I guess that is Coor's Beer that is in Golden?

Dr. HARPER. Right.

Senator JOHNSTON. Sort of the same first cousins, aren't they?

Dr. HARPER. Right. For the students it is a very important product.

Thank you very much.

SUPERCOMPUTING

I am here today to speak to the NSF budget and also to emphasize one portion of that. That is that I would like to specifically emphasize the important role that supercomputing and NSF's activities; that is, the important role that it plays towards the advancement of science and engineering in our country.

Supercomputing is one area of the U.S. activity where we have been a leader. It is absolutely critical to our national economic well being and our strategic capability to remain a leader.

Supercomputers are, by definition, those machines that at any one point in time are the fastest, most powerful computers. These devices have allowed our scientists and engineers to attack and solve problems that heretofore were impossible. It is that kind of capability that will keep us on the cutting edge of scientific and engineering prominence.

At the insistence of several committees pulled together by Congress and the scientific community, including a number of universities, such as Colorado State University, in 1984 NSF initiated a plan to enhance the supercomputing capability at our Nation's universities.

Senator JOHNSTON. How does what you do differ from what they did at the Florida State University?

Dr. HARPER. It is not really different in the sense that we are just one of the very few places in the United States that has this particular capability and we are making it available to researchers across the country.

Right now in the United States there are just a handful, approximately seven, supercomputers located in institutions.

Senator JOHNSTON. CRAY–1's?

Dr. HARPER. Well, some of them are CRAY–1's, sir. Some of them are ETA systems, 205's, et cetera.

Senator JOHNSTON. Are you doing this for floral research?

Dr. HARPER. We aren't doing specific research on the computers per se. Instead, we are doing research on how to apply these supercomputing devices to a number of scientific and engineering problems. It is to enhance the training of our engineers, mathematicians, and computer scientists to use these devices. That has been determined to be one of the principal critical needs of the country. And it is to make these resources widely available to the academic community across the country.

Now in 1984 NSF brought on line a program to enhance the supercomputing. At that particular time they went directly to those institutions that already had the capability.

Senator JOHNSTON. Dr. Harper.

Dr. HARPER. Yes.

Senator JOHNSTON. This has all been subject to peer review?

Dr. HARPER. Yes; they were.

Senator JOHNSTON. Was Florida State also subject to peer review?

Dr. HARPER. No; I am not sure if Florida State submitted a proposal to NSF or not. Florida State's program is not funded by NSF. It is funded by the Department of Energy.

Senator JOHNSTON. Yes.

Dr. HARPER. I'm not absolutely familiar with this.

Senator JOHNSTON. Syracuse has one, too, don't they, Dr. Harper?

Dr. HARPER. No.

Senator JOHNSTON. Or wanted one.

Dr. HARPER. Syracuse may have wanted one. Senator, the institutions that have machines now are Florida States, Georgia Tech, Purdue, Minnesota, Colorado State, Illinois, Cornell, Princeton, and a group of universities in California called the San Diego Consortium.

Senator JOHNSTON. I'm advised that Syracuse was in the Department of Defense bill last year. We got them on CRAY-1. A facility for computer research.

Now what you want here is that you have your machine, Doctor?

Dr. HARPER. Correct.

Senator JOHNSTON. So what do you want?

PHASE ONE PROGRAM

Dr. HARPER. What I'm saying is that in 1984 NSF went out and they purchased time on supercomputers that were existing at universities having this capability and made that time then available to a whole variety of researchers across the country. That has been an ongoing program. It has been called the Phase One Program. It really has accounted for the rapid increase in the use of supercomputers by the academic community. It has led to those kinds of breakthrough types of research and the prominent points that the Foundation has pointed to here to justify continuation of this program and to expand it. We do think that has been a very important segment of the program, Senator.

Senator JOHNSTON. Where did you get your computer to begin with?

Dr. HARPER. Initially, Colorado State University went out on its own initiative and got the machine on the basis of some State support and some industrial support; also Federal support. We have had a very small amount of Federal support and we have applied that to our program which has allowed us to expand it and provide this to a whole variety of other institutions, Senator.

Senator JOHNSTON. How does that allow you to expand it, Doctor?

Dr. HARPER. How?

Senator JOHNSTON. Yes.

Dr. HARPER. It has allowed us to expand it in the sense that it has given us time to expand our faculty and staff and computing capability. On top of that, it has provided time through the NSF, and they have designated researchers across the country to come and use our machine.

Senator JOHNSTON. Just to play the devil's advocate here.

Dr. HARPER. Yes.

Senator JOHNSTON. Would we not do better to put National Science Foundation money in a new computer rather than buying time on existing computers? This is considering that there is only so much time that is already available, and I am sure you would make it available to some researchers somewhere. I'm just playing the devil's advocate.

Dr. HARPER. Yes; right. I understand. I think that is a very legitimate question.

I would like to turn that around.

Senator JOHNSTON. Yes.

Dr. HARPER. I would like to turn that around and say that it seems to me it is cost-effective for the National Science Foundation to deal with institutions that, one, have demonstrated capability and interest and that have been in the business for 4 or 5 years who have found other sources of money to largely finance these developments, and they, with the rather modest buy-in of funds, could take advantage of that kind of capability, expertise, and focus that exists at these institutions. That is what I'm proposing today.

Senator JOHNSTON. Yes.

Dr. HARPER. What I'm trying to say is that in the wrapup of the NSF program, there have been two parallel paths. There is one path dealing with the purchase of time at existing centers, such as Colorado State University, where we were the first in the nation to install a machine that has been operating for 4½ years, and the University of Minnesota and Purdue to provide that time.

In addition to that, NSF has gone on the second approach to form centers of excellence in supercomputing. These centers of excellence are charged with the responsibility of keeping state of the art hardware, training graduate students in doing research and the like.

COMPUTER DEPRECIATION

Senator JOHNSTON. In that respect, my friend who is in computers who is trying to sell Congress on a 3-year depreciation, says that computers are obsolete after 3 years in general. Is this CRAY-1 up to speed after 4 years, Dr. Harper?

Dr. HARPER. I think it is not a question of whether it is the fastest and largest. I think that you need to take a look at what its capability is and its cost effectiveness. Right now the computing cycles on our machine are very cost effective at approximately $500 an hour. At that kind of cost versus the computing capability, the cost capability is essentially equivalent with other machines on the board or existing.

The other thing that I think is very important to recognize is that you need a machine that is in a stable operating environment where people can come and easily use it to solve their problems rather than in a sense be dickering with the startup problems that are associated with some new machine. We need to continue to have a progression of machines.

Now one of the things that I think is vital in this program and one reason why I think it is so essential to continue the funding for these Phase One centers is that this allows them and the State and other resources to provide a stream of long-term funding where these centers can continue to upgrade their hardware and remain on the state-of-the-art curve with that hardware.

You are absolutely right in this particular area that the equipment's lifetime is relatively short. If you don't have those kinds of plans and capabilities, then, indeed, a center's capability could get out of step with reality, with a reality situation.

Thank you, Senator.

Senator JOHNSTON. Thank you very much for that excellent presentation. I have learned something about computers.

Dr. HARPER. Thank you.

Senator JOHNSTON. Thank you, Dr. Harper, for coming here today.

Dr. HARPER. Yes, sir.

[The statement follows:]

STATEMENT OF DR. JUDSON M. HARPER, VICE PRESIDENT FOR RESEARCH, COLORADO STATE UNIVERSITY

Colorado State University (CSU) was this country's first university to order and install a supercomputer. Since 1981, CSU has operated a supercomputing center for its own sophisticated research needs and for the benefit of a wide variety of remote users. In 1985, CSU became a NSF Phase I Resource Center which has provided supercomputing resources to a large array of academic researchers.

CSU has been committed to expanding the availability and use of advanced computation in the nation's research and development efforts. We believe computationally-based research stands alongside theoretical and experimental approaches as a third technique to advance our nation's scientific and engineering prowess. And, as you know, scientific advancement spurs our nation's economic development. To support these efforts, University representatives told Congress of the need for special initiatives which would utilize the academic community to develop and enhance advanced scientific and engineering computation. It is from this perspective of demonstrated commitment, action and experience that I wish to address several points about the budget level, direction and priorities NSF's Advanced Scientific Computing efforts.

NSF has had an Advanced Scientific Computing initiative since 1984 and taken several approaches to fill these needs with academic institutions. To satisfy the immediate requirement for supercomputer access, NSF bought time on existing supercomputers to allow researchers to conduct advanced research work. These Phase I Center awards were made to Purdue University, the University of Minnesota, Colorado State University, and three commercial firms. Each of the universities had taken a bold and somewhat risky leadership step by investing significantly from their own financial resources to be the first to establish supercomputing facilities. In addition to installing the hardware, each institution developed telecommunications, training and other support services necessary to make such facilities available to on- and off-campus users. To date, nearly all the concrete examples of how the supercomputer can beneficially impact academic scientific and engineering research have come from researchers using the Phase I Centers.

In addition to providing supercomputing resources, NSF has recognized the need to support supercomputer centers of excellence which will maintain state-of-the-art computing hardware, focus on research related to supercomputing, and provide training and education on advanced computational methods. This need is currently being addressed through the awarding of Phase II Centers to the Princeton Consortium, Cornell University, the University of Illinois, and the San Diego Consortium. This original group has been expanded to include the Pittsburgh Consortium, to which NSF gave a Cray I computer to initiate Center activities. NSF's selections represent an impressive potential array of talent and capability. However, none of them had an operating supercomputer or supercomputing experience at the time of the award. In the absence of existing hardware and capability at these Phase II Centers, NSF is providing funding averaging approximately $10 million per year at each of these Centers, with commitments at this level for the next five years. In the long-term, NSF plans for the Phase II Centers to be permanent and the principal source of academic advanced scientific computing research effort for the nation. Researchers located at other campuses remote to these locations will have to communicate with these Centers through high speed data communication systems which have only been rudimentarily defined, and are expected to be available within a three year time frame. Further, researchers at remote locations will have difficulty in sharing in the scientific climate at these Centers without traveling to them.

In 1984, the original congressionally approved plan for supercomputing called for the development of between 8-10 supercomputing centers of excellence requiring an annual budget expenditure amounting to $100 million. The current five supercomputer centers of excellence, funded at about $55 million annually, falls far short of the original objective. Moreover, it has taken the Phase II Centers more time than expected to become fully operational which has had a delaying effect on the availability of supercomputing resources to the U.S. academic research community.

Based on the above, NSF has recognized the need to provide more supercomputing resources by extending the Phase I Center funding in FY 87 at the level of only $2.3 million. This will reduce the NSF expenditures for Phase I Centers from $9 million in FY 86 to one-fourth that amount in FY 87.

The limited FY 87 NSF budget for Phase I Centers will restrict NSF from accessing proven supercomputing resources and capability. We at Colorado State University feel the proposed approach limits NSF's ability to satisfy researcher's rapidly expanding needs for supercomputing, which in turn bolsters our nation's economic and strategic capabilities. In a time of budget restrictions, continuing support of the cost effective Phase I Centers appears to be a prudent course of action. Focusing limited funds on a few Phase II Centers concentrates advanced scientific and engineering computational research at relatively few sites which limits the nation's rate of expansion of a trained pool of manpower, discovery and application. Further, the proposed plan does not address the issues of access, regional distribution, and broadened areas of scientific and engineering focus through funding of a greater diversity of Centers.

We would strongly support NSF's budget for Phase I Centers be maintained at FY 86 levels to sustain this important segment of NSF's advanced computational initiatives. Such a move would recognize that the current academic Phase I Centers provide a principal source of training, graduate education, advanced computational research, telecommunications, etc., which are essential to achieving the NSF objectives. Maintaining the funding level for the current academic Phase I Centers for the purchase of supercomputing cycles and to support training, graduate education and research will sustain faculty interest, provide a greater pool of manpower, broaden areas of computationally-based research and application, encourage greater industrial interest, expand state investment and matching, assist with equipment upgrades to maintain state-of-the-art computational hardware, provide more geographic diversity of supercomputing activity and increase exposure and usage of a variety of American-built supercomputing hardware. The cost/benefit ratio for this continued Phase I approach would be significant because of the extensive experience in operating and utilizing advanced computing hardware that exists in universities which have supercomputers.

Let me use CSU as an example of how a modest amount of Phase I funding has benefited the NSF program in advanced scientific computing and been leveraged to create a substantial impact well beyond the direct impact of the NSF funding.

1) The State of Colorado has expended funds to network its research universities and provide access to the supercomputer at Colorado State University with 56 kB lines. This network will be upgraded to T1 speed in 1987 through an expanded State of Colorado investment and assistance from Mountain Bell and US West.

2) The Colorado legislature is considering authorization of $2.0 million annually to underwrite its share of supercomputing costs on an ongoing basis. The use of these funds for matching extends the benefits of Colorado's supercomputing program to all participants.

3) Colorado is serving as a catalyst to draw together regional universities to establish a networking system to increase access to supercomputing resources.

4) Industry is seeking supercomputing training for its employees and supercomputing access for the purpose of enhancing their research and development programs. Industrial buyins for these users are expected to exceed $1 million with the Colorado network in place.

5) CSU has provided supercomputing resources to 106 NSF-funded researchers from 39 university locations. Additionally, 65 CSU researchers, who do not have NSF awards, are involved in supercomputing applications on the CSU CYBER 205. These researchers are doing significant research in the areas of fluid mechanics, chemistry, image processing, atmospheric science, engineering, artificial intelligence, applied mathematics and modern biology.

6) Special training programs have been developed for the CYBER 205 supercomputer at CSU including materials and workshops. Through these programs 90 persons have been trained and six workshops have been held.

7) An extensive graduate education program in supercomputing applications has been developed on the CSU campus which involves 12 graduate courses and 240 graduate students. NASA has designated CSU as a graduate Center of Excellence in Large-Scale Scientific Computation.

Greater support to an expanded Phase I Centers program is necessary for the continuity of funding needed to assure equipment upgrades and commitment to the effort. Such an approach will allow the NSF initiative to build upon existing programs and demonstrated excellence in the advanced computational arena.

Finally, we favor an expanded NSF budget emphasizing support in the area of advanced scientific computing in order for our nation to maintain its leadership in this vital area. This, coupled with a programmatic funding strategy which emphasizes more diversity in the centers of excellence in advanced computing, and increased and improved telecommunications, will serve our nation best at this particular time.

Senator JOHNSTON. Next we would like to welcome Mr. Andrew M. Gleason, Hollis professor of mathematics and natural philosophy, Harvard University. He is here on behalf of the Joint Policy Board for Mathematics.

[No response.]

Senator JOHNSTON. I see that Mr. Gleason is not here at this time.

Next on the list will be Mr. William D. Carey, executive officer for the American Association for the Advancement of Science.

Is Mr. Carey here?

[Pause.]

[No further response.]

STATEMENT OF LATTIE F. COOR, PRESIDENT, UNIVERSITY OF VERMONT

INTRODUCTORY REMARKS

Senator JOHNSTON. Next is Mr. Lattie F. Coor.

Welcome, Mr. Coor. Please proceed.

Mr. COOR. Thank you very much, Mr. Chairman.

I must tell you how impressed I am with the chairman and the committee that it is running ahead of schedule. I won't comment on the culture of this great Senate in detail since I don't know it fully. This is my first experience, I must say.

Senator JOHNSTON. It is one of my first, too.

Mr. COOR. I will try to keep in the spirit of that by not taking an advantage of the early beginning and will keep myself within the length of time allotted.

I'm Lattie Coor, president of the University of Vermont. I'm appearing here today on behalf of five associations: The Association of American Universities, the National Association of State Universities and Land-Grant Colleges, the American Council on Education, the two graduate school associations, and Council of Graduate Schools.

I have submitted my statement for the record. I will draw from that statement to make three points here today within the time allotted. Then, of course, I will answer any questions you would like to ask.

Senator JOHNSTON. Yes.

Mr. COOR. As I do so, I would note the rather unusual feature that brings me here since one would expect on behalf of these associations someone from one of the larger research universities in the country.

We are an active NSF participant. But the share of our research budget drawn from the National Science Foundation is not that of the average major research universities, nor are we at this stage one of those that fits the criteria of the Association of American Universities.

HEALTH SCIENCES

On the other hand, we represent one of those fascinating creatures that has long had a powerful research base, being primarily the health sciences. Our college of medicine ranks second in the Nation in percentage of its budgets funded by the National Institutes of Health with an admirable track record of competitiveness.

In the larger areas of science and engineering we have been until about a decade ago primarily an undergraduate institution as such.

As we have seen the strength and quality of our graduate programs grow in the sciences and in engineering, we have then become a more active participant, including currently being a candidate on a statewide basis for one of the grants. It is from that vantage point an institution that is itself active and richly involved in research, but not as actively involved historically in work of the National Science Foundation that I bring my comments to you today.

The three points that I would like to make are these. Two of them are directly embraced in a concern that I have, and a concern that I hope that this subcommittee and the parent committee itself would have, about the broader question of the health of academic science and the responsibilities that each of us have to insure strength in our capacity to do good science and train good scientists and engineers for the long haul, Mr. Chairman.

My specific concerns are for an institution that delivers both research and training. I would urge for this committee and the appropriations process that your concerns be in that broad delivery capacity as well.

Three points. One is having to do with the unintended consequences of several key matters now before the Congress, none of which are explicitly before this committee, but all of which have a direct effect on our capacity to deliver.

The second is the key role of this subcommittee and the parent committee and the National Science Foundation bill here itself in committing to an essential investment in training manpower for the future.

FISCAL YEAR 1987 NSF BUDGET

Finally, some specific comments about the NSF budget for fiscal year 1987.

Unintended consequences are a way of life for universities. Many pieces of legislation with laudable goals do not consider at times what their effect on the campus will be.

At the moment we find ourselves facing a triple ratcheting of issues that are before the Congress.

First, there are the clear concerns about budget triggered by Gramm-Rudman, and now the President's budget that followed that. There we find three issues that have a particular effect on us—student aid—though that effect will be much more explicit in fiscal year 1987.

There is the National Institutes of Health budget itself and the medicare and medicaid reimbursement budget, which for my institution and as all that have major medical schools, that will affect our capacity to carry out some of the responsibilities we have, since patient care is an important part of our funding.

Second, I would note the ratcheting effect of the proposed revisions in the Office of Management and Budget, the Circular A–21.

You are familiar with the fact that with 30 days' notice the circular now imposes a 26-percent cap on administrative costs. It is slated to make a further reduction to 20 percent in the next year. What it does is to impose by administrative regulation a set of constraints on what had been historically very carefully negotiated figures.

For the University of Vermont that 26-percent cap alone will signal a 20-percent reduction in our indirect cost recovery in the coming year.

The third part of that ratcheting effect fully a field from this committee, but of importance nevertheless, are the potential effects of the Tax Reform Act on charitable giving, Mr. Chairman.

I won't belabor the last point even to describe it. I'll simply note to you that we don't wish to be exempted from our share of the national financial problem. But at this stage we are particularly concerned about having a disproportionate share of those reductions; that is, sharing a disproportionate share of those reductions. This is especially since our endeavors are not those that created the level of deficit that currently exists.

Let me move now to part of my observations to you today. The importance of investing in the future.

INVESTING IN THE FUTURE

There is our concern about the difficulty we face in sustaining the entreprise or graduate study research and training in science and engineering.

Obviously, you have immediate problems in perfecting a budget for 1987. But I would urge you and the parent committee to think of this budgeting exercise in long-term ways and distinguishing between the expenditures that must be used for the moment and the question of investments in the future, Mr. Chairman.

I would urge that at this moment especially you pay particular attention to balancing the demands of the present as against the needs of the future.

What is needed for the future? Insofar as the National Science Foundation is concerned, I think that the most appropriate indicator or that is is contained in a document that I would would like to introduce for the record, if it is not already a part of it. This is done by the White House Science Council Panel on the health of U.S. universities and colleges. It is a committee that was asked for by—well, asked for by Mr. Keyworth and chaired by David Packard and Alan Bromley, a professor of physics at Yale University.

I have included in my testimony an executive summary of that panel's recommendations. I believe they represent a very significant blueprint in manageable form to read and to digest for the NSF appropriations themselves.

Their findings simply reaffirm the essential nature of colleges and universities to produce scientific and technical talent for the future. Talent is essential to our economic and technological progress.

Their conclusions are that the capabilities to attract the very best students are being steadily eroded due to obsolete equipment, outdated laboratories, and increasingly severe shortages of advanced students.

STUDENT AND FACULTY PROBLEMS

Let me just from that highlight the student and faculty problems and then direct your attention and that of the committee to pages 7 and 8 of my testimony which outlines the full findings of that panel, as well as to the panel's executive summary itself.

We are seeing substantial enrollments in recent years in engineering colleges, but we cannot fully meet the faculty demands that exist right now. Enrollments have grown 115 percent over the past 15 years. The faculty has grown by only 10 percent. Also 1 in 12 engineering faculty positions is currently vacant.

We then face a fascinating roller coaster problem where the decline in 18- to 22-year-olds over the next 8 years will be such that we will be producing 700,000 fewer baccalaureate degree holders over that period of 10 years than we have produced over the period of the last 15.

What we find therefore is a significant increase in the students to the moment, not enough faculty members to meet the full demands of those students, a decline in the student body over the next decade with a commensurate decline in the faculty. Then, in the mid-1990's, a potential significant run-up in the enrollments themselves.

If we are to meet both the output demands for the baccalaureate degree holders, we must make science and engineering more attractive. If we are then to produce the faculty that is necessary for the second period of that 20-year cycle, we have got to be preparing graduate students and faculty members over the next decade.

The level of investment in academic research and advanced education right now will not permit us to accomplish that, Mr. Chairman.

In 1984, this Nation invested $100 billion in research and development and only $8.4 billion of that was invested in the universities.

The conclusions of this White House panel that I present with my testimony puts it in fairly direct terms. We must invest much more substantially or we will fall, as the chairman says, in an order of magnitude behind.

Let me now turn to four specific items in the NSF budget and then close my comments.

The National Science Foundation is a terribly significant instrument for graduate study and research on our campuses in funding 25 percent of the total Federal basic research funds in universities.

First, the individual investigator grants that are included, as to this, we are encouraged to see that there is a proposed expansion in the involvement of graduate and undergraduate students in many of the research programs.

We hope that the new programs will not erode support for existing ones. We note with special concern that, once again, the social and behavioral sciences which had eroded from 1980 to 1982, that was reversed and it is now slated to slide back again as a result of reductions last year.

There has been a substantial loss in overall value in constant dollars. We find, as well, a proposed reduction in the astronomical sciences would lead to a further erosion there, Mr. Chairman.

In short, we are pleased to see an expansion, but we feel the level of increase is not as significant as is needed for the long-term health of the science and technology industry on our campuses.

GRADUATE FELLOWSHIPS

Second, in graduate fellowships, they are essential to this manpower production which we note. Yet, once again, they are slated to be level-funded. We understand 560 new awards are planned with a steady state of 1,500 competitive fellowships, but there is no adjustment in the student stipend.

The National Science Foundation stipend is substantially below other programs. For example, the very small but influential program of the Office of Naval Research.

The cost of education in the budget proposed would be a particular program since it reduces that cost of education from $6,000 to $5,250. What, in effect, that does is further, Mr. Chairman, ratcheting the problems I described at the outset, which is to leave the host universities to carry a larger part of the burden.

Third. Undergraduate science and engineering.

I mentioned earlier the prospect of the drop in undergraduate student enrollments. Yet we see only a modest increase for science and engineering activities. We are pleased that the increase proposed for the college science instrumentation program is a $2 million increase, which is not huge in dollars, but significant in trend. Yet everything else is level funding.

Here I would point to a special study done by the task force asked for by the Director of the National Science Foundation. This was undertaken under the leadership of the American Council on Education, including all of the key associations in higher education, and a special report which I also will include with my testimony for the record. That finding again underscores the importance of a major investment in the undergraduate research. Its findings are contained in my testimony. I would urge your attention and that of the committee staff toward those recommendations. They were asked for by the Director. They speak specifically to the importance for continuing great strength in the undergraduate Science and engineering programs.

Finally, I would speak to instrumentation and facilities, Mr. Chairman.

About 20 percent of the total National Science Foundation research funds are allocated to the acquisition of research equipment. Yet there is very little progress in enabling the research institutions to replace and modernize laboratories.

I am including as well a statement by various associations endorsing and saluting the National Science Foundation for sticking for a competitive basis for decisions for facilities and equipment. Yet I must note that all of us are so starved for those funds that we cannot possibly replace and modernize our laboratories in a way that will meet those requirements. The Federal investment in facilities is virtually nonexistent beyond this limited program and beyond the National Science Foundation. This must be addressed.

In short, Mr. Chairman, we find the National Science Foundation budget proposed certainly a more—that it proposed a more positive budget than we are seeing in the National Institutes of Health and elsewhere. We commend that to this subcommittee.

At the same time I would urge that we look to the long term and note that we do need to make a substantially greater effort in attracting graduate students and faculty. Through that it is investing in the quality of research, equipment, and facilities that must go with that and in those prospective students for the future.

That completes my oral summary of the testimony.

Senator JOHNSTON. Thank you.

Mr. COOR. I would, of course, be glad to answer any questions you have.

Senator JOHNSTON. Thank you very much.

As I said to a previous witness, I very strongly agree that we need more resources in science and technology and research education. It doesn't look like we are going to get it in the present direction we are going. But at least there are some of us who are strongly in favor of that.

Mr. COOR. Yes.

Senator JOHNSTON. Thank you.

Mr. COOR. Yes, sir.

Senator JOHNSTON. We now have a vote on.

Mr. COOR. Yes, sir.

Senator JOHNSTON. There being a vote now on, the committee will be in recess for a few minutes.

[The statement follows:]

STATEMENT OF DR. LATTIE F. COOR, PRESIDENT, UNIVERSITY OF VERMONT, ON BEHALF OF THE ASSOCIATION OF AMERICAN UNIVERSITIES, NATIONAL ASSOCIATION OF STATE UNIVERSITIES AND LAND-GRANT COLLEGES, AMERICAN COUNCIL ON EDUCATION, ASSOCIATION OF GRADUATE SCHOOLS, AND COUNCIL OF GRADUATE SCHOOLS IN THE UNITED STATES

I appreciate the opportunity to discuss with you the proposed budget of the National Science Foundation. My remarks are on behalf of five leading higher education associations. It is difficult to recall a year in which budgetary matters were so filled with uncertainty, in which the whole process seemed headed toward a destination which no one in it could foresee, and in which the possibility of serious damage to important social institutions seemed so real.

This, indeed, is not an ordinary year. What most marks it off from others is a pervasive sense of vulnerability that makes even good news suspect. Universities feel that vulnerability keenly because several essentially unrelated policy lines seem to be converging, and if they truly do meet, then there is the real prospect of very serious damage to those institutions and to the intellectual activity for which they are responsible. Let me briefly describe those lines and explain why they should be of interest to Members whose responsibilities include the maintenance of America's capacity for science and science education.

The first set of policies to impinge on universities are those set in motion by deficit reduction pressures. NSF stands out among federal agencies for its proposed increase for FY 1987. That very fact may make it vulnerable as it moves through the Congress, but the main point is that virtually every other program on which universities rely is slated for significant reductions. The proposed cuts in student aid, in the NIH budget, and in Medicare and Medicaid reimbursement will strike heavy blows at mainline university activities, and will force either reductions in institutional programs or the increased subsidizing of those activities by other elements of the institution.

Second, the proposed revisions to OMB Circular A-21, recently published, which would cap particular components of indirect cost recovery, will hit the budgets of research universities heavily. If those rules take effect as proposed, losses in the millions of dollars a year will be incurred by individual institutions, and virtually all universities will suffer noticeable reductions. In part, the new rules are prompted by the deficit pressures, but the impetus for them predates the present crisis and really derives from a deeply held belief by some that the costs of research that can be associated with an individual project are somehow more real and important than are those costs that need to be pooled and allocated to all projects. That may sound like a rather arcane bit of accounting theology, but unfortunately the effect of policies based upon it will be to starve the body while expecting the brain to continue to function. Such a policy will not work for long.

The third line of policy converging on universities makes the effects of the first two even more devastating. The tax reform bill that passed the House last year contains a number of provisions that will simultaneously cost universities more money and severely undermine their ability to raise money from private philanthropy. I will not take time this afternoon to describe the problems in that legislation. I will simply say that the deliberations that led to the passage of the House bill did not include considerations of education or science policy, but the effect of the provisions adopted must be taken into account by anyone who cares about the health of America's universities or the nation's capacities in science and technology. With the exception of the proposed institutional cap on the issuance of tax exempt bonds by private colleges and universities and the treatment of scholarships and fellowships, Senator Packwood's proposal is uniformly more favorable to education and research.

Let me make it clear that neither I nor any of the university presidents I know claims a special educational exemption from the solution of the nation's fiscal problems, nor do they ascribe these problems to some dark, anti-university conspiracy. However, all would, I think, argue that the combination of circumstances I have described exposes universities to special and largely unintended jeopardy, and they would wish that important fact to be considered by those who make policy for the nation.

Now, you may ask, What is to be done? The answers for this year are clear enough. They are, where possible, as with NSF, to support budget levels that will help sustain the enterprise through a difficult period; to help to prevent arbitrary, damaging, and nonnegotiated changes in the principles that govern indirect cost recovery by urging OMB to enter into genuine consultation with affected parties; and to oppose changes in the tax code that would lessen the incentives for private philanthropy and thereby make it less likely that private efforts can compensate for the inevitable diminution in federal programs.

That is the immediate program, and it is an important one. But it is not enough. If we are to achieve solutions to our current problems that will not just provide immediate relief but will also lay the foundation for sustained national health, then we submit that it will help to begin to think of national budgeting in more than arithmetic terms. We do not put together budgets in private or public life in order to have them balance at the end. What happens at the end is the result of a complex set of judgments about what we need and what we can afford. In all organizations except government, we distinguish between expenditures for current use and investments aimed at future return. Without that elementary distinction it is impossible to make analytical sense out of our national accounts or to know whether we are spending too much or too little. And if we are unable to do that, it is hardly any wonder that we are unable to come to grips with the question of how much money we need to raise as a nation in order to meet the demands of the present and the needs of the future.

In that last sentence lies the key element in your efforts to find a broad and solid base for the future productivity of basic scientific and engineering research and training and of the institutions in which those take place. It is doubtful that there can be a coherent and realistic program for meeting the nation's real needs that fails to take a hard look at revenues along with expenditures. When all is said and done, we are not paying for what we need, and any solution that does not confront that fact will do more harm than good.

We are aware, Mr. Chairman, that these opening remarks have gone far afield from the testimony that one would ordinarily give on this occasion. I have done so because it seems to us evident that when you have finished work on this NSF budget, you will, as Members of Congress, face an agenda that is even more important to science and to universities than the annual budget of any single agency can be. As you approach those larger issues, I urge you to bring to them the same purposes and perspectives that move you to believe that the work of the National Science Foundation is worth your support.

REPORT OF THE WHITE HOUSE SCIENCE COUNCIL PANEL ON THE HEALTH OF UNIVERSITIES AND COLLEGES

Before turning to our specific comments and suggestions with regard to the FY 1987 Appropriations for the Foundation, I must call to your attention an important new report to be published shortly by the White House Science Council titled A Renewed Partnership. The analyses, conclusions and recommendations of this report bear directly upon the university research programs and the FY 1987 budget proposals of the National Science Foundation.

In 1984 Dr. George A. Keyworth, Science Advisor to the President, asked a panel of the White House Science Council, chaired by Mr. David Packard and Dr. D. Allan Bromley, to examine the health of universities and to determine whether they are equipped to meet our future requirements for highly trained talent and new knowledge. The panel conducted an eighteen month study. The Panel's report is a thorough examination of the health of our universities and of their capabilities to meet our future requirements for well trained talent and new knowledge. We commend to your particular attention several of the Council's conclusions and recommendations. The prepublication Executive Summary is attached (ATTACHMENT).

The Council's report reaffirms one fundamental fact: our universities and colleges are important to our national interest because they produce the scientific and technical talent essential to our economic productivity, our technological progress, our health, our national security, and ability to compete in the international marketplace. While our universities remain unequaled in the world, there are troubling signs that their capabilities to attract and educate the best students in science and technology are being steadily eroded. Problems associated with obsolete equipment, outdated laboratories, increasingly severe shortages of advanced students and faculty are not being properly addressed. They continue to hamper us in essential fields of science and engineering.

We will all do well to consider thoughtfully the implications of the Council's sobering conclusion:

"_Our universities today simply cannot respond to society's expectations for them or discharge their national responsibilities in research and education without substantially increased support._"

It seems that we are at a crossroads. We see it clearly, for example, in the indicators of our position in the international marketplace. Every one of our balance of trade indicators now has turned negative. Since 1980 even our high technology balance of trade has steadily declined. Our agricultural trade balance now is also negative. Industrial productivity continues to erode steadily, especially in comparison to our foreign competition.

Our greatest need is for talent. Highly trained people are our richest resource. Yet, we face a shortage of highly trained talent. At current production rates, and in the face of a declining student pool, we face serious shortfalls of trained scientists and engineers. The result is a growing dependency upon foreign nationals, an uncertain source of supply. The recent NSF report _Science Indicators 1985_ states that between 1980 and 1983 total full-time enrollment in graduate engineering and science programs grew by 6 percent; however, 85 percent of this increase is accounted for by foreign students. And, despite the increase in total enrollment, foreign graduate student populations in the top 25 percent of graduate departments actually _declined_ significantly.

In 1983 foreign students accounted for about 40 percent of total graduate enrollment in engineering, mathematics and computer sciences. More than one-half of PhD degrees earned in engineering now are awarded to foreign nationals. Fortunately, about 40 percent of the engineers and 60 percent of computer scientists remain here. Still, undergraduate enrollments in engineering, computer science and related fields are climbing to record highs. As they do, we are increasingly dependent upon foreign nationals to teach them. We simply are failing to attract sufficient numbers of talented U.S. students into high quality graduate programs in engineering and science.

Many of our universities lack sufficient numbers of faculty to sustain growing undergraduate programs at the highest level of quality. The Engineering Education Task Force (formed by the National Society of Professional Engineers, the American Society for Engineering Education and the National Association of State Universities and Land-Grant Colleges) reports the following:

- Engineering faculty shortages remain a paramount concern. Currently, one in twelve budgeted positions is vacant. As much as a 23 percent increase in positions is needed to bring the student-faculty ratio close to optimum teaching conditions.

- High enrollments at the undergraduate level strain an already sparse faculty and poor conditions for instruction. While enrollments have grown more than 115 percent over the past fifteen years, faculties have growth by only 10 percent.

- A majority of entering engineering students is in the top 10 percent of their high school graduating class; their ability is helping, but only somewhat, to offset present limitations.

The root cause of this situation is obvious to all who have examined the situation carefully: we are underinvesting in academic research and advanced education. In 1984, the nation invested nearly $100 billion in research and development; only $8.4 billion was invested in universities. Despite overall gains of about 8 percent in FY 1984, and larger increases in essential fields such as computer science and mathematics, overall Federal investment in universities and colleges continues to decline as a percentage of total Federal R&D. Nevertheless, Federal agencies are, and will remain, the primary source of national investment in basic science and engineering.

In FY 1986, according to the National Science Foundation, Federal agencies will provide two-thirds of total academic R&D support. Academic institutions are expected to spend $7.1 billion in FY 1986 for the portion of the total that is basic research; two-thirds ($4.8 billion) will come from Federal agencies.

At present rates, our total investment in R&D will double in ten years. This, the White House Panel concludes, will be inadequate to our needs. Present policies and funding programs will not do the job required. More rapid growth is essential if our universities are to meet future requirements and maintain our critical technological advantage.

Dr. Alan Bromley, CoChairman of the White House Panel, in a briefing for a special meeting at the National Academy of Sciences, estimated that if present levels of Federal investment are sustained for a decade we will fall "an order of magnitude short" of meeting our needs in the 1990s. The research agencies of the Federal government, the Science Council concludes, are the only source of funding for the needed investments.

Each of the following recommendations of the White House Science Council Panel has immediate implications for the FY 1987 Appropriation for the National Science Foundation. The Council recommends that Federal government agencies that support university research take the following steps:

- increase substantially investments in universities and colleges,
- establish university-based interdisciplinary, problem oriented research and technology centers,
- bear the full share of the cost of university research,
- establish policies that recognize university infrastructure (research facilities and equipment) costs as integral to university research,
- minimize burdens and expand the flexibility of the administrative arrangements for the support of research,
- establish substantial programs of multiyear, merit-based graduate fellowships in science, mathematics and engineering, and

- encourage interdisciplinary activities at the graduate level.

The White House Science Council, in summary, invites all of us to consider two alternative investment policies for our research and training enterprise. One is to continue present policies of incremental and decremental adjustments to a system already seriously hampered by the effects of prolonged underinvestment. A second alternative, endorsed by the Council, is to make the difficult decisions now, even in these unusually difficult budgetary circumstances, to double federal investments in university research and training programs, including those of the National Science Foundation and thereby to seize the rich and unprecedented opportunities for scientific and technological progress.

THE RESEARCH PROGRAMS OF THE NATIONAL SCIENCE FOUNDATION

Let me now turn to the specifics of the Foundation's Budget request, and begin by addressing the research budget.

First, we congratulate Mr. Bloch, Director of the Foundation, and the National Science Board for presenting to the Congress a strong, reasonable and generally well-balanced budget for the National Science Foundation. The NSF budget request for FY 1987 recognizes clearly that even in these difficult times, we cannot afford to reduce our investment in academic science and engineering. Sustained budgetary stringency requires that we make difficult choices. In making these choices we must, as the report by the White House Science Council makes clear, sustain investment in the production of the two ingredients essential to our welfare: the talent of our young people and our expanding body of new knowledge. We must provide for continued investment in the education of our young men and women, and take those necessary steps to encourage able and interested students, especially underrepresented minorities and women, to pursue undergraduate and graduate programs in academic science and engineering.

When national investments in education and research are combined in the university enterprise unique benefits result. Now more than half of all federal basic research programs are carried out in universities and colleges; NSF alone accounts for 25% of total federal basic research funding in universities. When students work with faculty teams engaged in national competitive research programs, research and education become the same activity. That bond forged between education and research is the unique strength of academic science and engineering. We are encouraged to see, therefore, that NSF proposes to further expand involvement of graduate and undergraduate students in many of its research programs. (In FY 1987 NSF estimates that 13,100 (+7%) graduate students, 4,500 (+25%) undergraduate students and 3,700 (+4%) postdoctoral students will be participate as research personnel on NSF research grants.)

As the promising and important initiatives announced by the Foundation go forward, it will be important to pay careful attention to the matter of balance between them and the core funding mechanism of the Foundation -- the individual investigator grant. The budget request for research and related programs gives special emphasis to biotechnology, computational science and engineering and global geosciences. The Cross-Disciplinary Engineering Research Centers (ERC) program proposes to create up to five new university centers jointly funded with industry. The advanced scientific computing activity will be strengthened, although no new centers are proposed. As presented, the budget sustains investment in competitive awards to individual researchers. It seeks to protect progress made in recent years to strengthen the average size and duration of foundation grants. We trust that these gains will not be compromised by the development of exciting new initiatives.

One research area has posed particular concerns for the past several years: the Foundation's social and behavior sciences programs. As you know these programs were subjected to sharp reductions in the period between FY 1980 to FY 1982. We are pleased to see that for a few years they made progress toward regaining their appropriate place in the NSF research budget. In FY 1986, however, that progress was reversed. The final funding level for the behavioral and social sciences was cut last year to below FY 1985 levels. We now face the prospect of renewed erosion of these fields, and that is sobering.

In the FY 1987 budget proposal again proposes to restore, in current dollars, the sharp reductions imposed just a few years ago. However, in light of the cuts imposed in FY 1986, we must point out that real investment in these fields, measured in constant dollars, remains significantly below the FY 1980 level. Our investment in the behavioral and social sciences has eroded by about one-third in just six years. This, we believe, does not adequately reflect and appropriate recognition of the potential contribution of research and education in these fields to our productivity and security.

We also would call to the Committee's attention one potentially anomalous aspect of the budget request: the request for astronomical sciences. When most of the sciences and engineering research programs are slated to receive at least a measure of real growth, a reduction in constant dollars is proposed for the astronomical sciences. Because the NASA astronomical sciences budget also is under considerable strain this year, we believe it is timely to inquire about the combined consequences for university astronomical sciences programs of such a sharply constrained budget request. We ask that the Committee review carefully the request for the astronomical sciences program in the context of the prospects for total federal support for the field.

GRADUATE FELLOWSHIPS

We are dependent on our ability to attract and train talented people in science and technology to the highest levels. And we are not doing that job well enough. Our best young people are not being attracted into scientific and technical careers in sufficient numbers to meet our needs. For many years one of the most effective programs in helping to identify and attract young talent has been the NSF Graduate Fellowship Program.

Again this year the Graduate Fellowship Program is level funded. We understand that about 560 new awards are planned with a steady state of 1500 competitive fellowships. No adjustment in the student stipend is proposed. After making progress toward overcoming the effects of a decade of erosion the program again is beginning to lag significantly behind market forces competing for the best young minds in science and engineering. The NSF program continues to provide stipends substantially below those of the small (40-50 awards per year) competitive program of the Office of Naval Research (ONR). The ONR program provides a first-year stipend of approximately $13,000 per year, full tuition and a supplemental research award to departments selected by each ONR fellow.

This year the cost of education allowance poses a particular problem. For more than a decade the allowance has fallen steadily behind the actual cost of graduate education in the sciences and engineering. This year, the NSF program is proposing to take a further step backwards by reducing the cost of education allowance that accompanies each NSF fellowship from $6,000 to $5,250. Instead of covering even the cost of tuition, which itself fails to meet the true costs of instruction, the NSF requires host universities to subsidize the program in steadily increasing amounts. This is a troublesome and growing inequity in this unique program. We urge that present funding levels for the cost of education allowance be sustained.

UNDERGRADUATE SCIENCE AND ENGINEERING EDUCATION

Mr. Bloch testified to this Committee that the United States is falling behind our competitors in the production per capita of scientists and engineers. The proportion of our young people now attracted to university programs of science and engineering is declining. Looking ahead, if we continue to attract students into these fields only at the 1983 rate, then, as a result of certain declines in the numbers of 22 year olds, we will produce almost 700,000 fewer baccalaureates in these fields over the next 20 years. The National Science Foundation has a serious leadership responsibility in science and engineering education at the undergraduate level.

The Foundation is proposing only a modest increase for science and engineering activities. With the exception of the College Science Instrumentation Program, which is increased by $2 million. In order to fund between 75 and 80 new projects, all programs are maintained at their FY 1986 level. Although we are pleased to see an expanded commitment to education, especially in our schools of engineering, the proposed program level can be considered only the first step toward addressing the problems associated with obsolete instructional equipment and materials.

Recently, at the request of the Director of the Foundation, the American Council on Education, in conjunction with several other Associations appointed a special task force of college presidents to establish a consensus on priorities for NSF leadership and support for undergraduate science and education. We are pleased to present these recommendations to the subcommittee. The report is appended (ATTACHMENT). For your convenience the following is an abbreviated summary of the Task Force's recommendations:

A. Increase Participation of the Undergraduate Sector in NSF Activities.

   -strengthen links with undergraduate institutions

   -involve more faculty from non-doctoral institutions in panels and as members of the National Science Board

B. Strengthen NSF Leadership in Science and Engineering Education

   -expand support for research at undergraduate institutions

   -allocate in increased share of research funds to investigators in undergraduate institutions

   -encourage investigators in undergraduate institutions to compete for research awards

C. Assign First Priority to Undergraduate Instructional Equipment and Materials

-substantially expand the College Science Instrumentation Program

-make awards competitively

-permit institutions to apply expenditures for installation and maintenance to their matching requirement

-ensure that institutions awarded funds provide for proper maintenance of funded equipment

-expand eligibility for support of development and application of instructional technology to improve the quality of instruction in the sciences

-assist new and emerging science programs

-encourage technology transfer among undergraduate institutions

D. Assign Second Priority to Faculty and Student Needs

-expand support for undergraduate research activities across all research directorates

-expand opportunities for undergraduate faculty under the teacher enhancement and informal science education program

E. As an added dimension undertake two special initiatives:

-establish a limited number of consortia as centers of instructional excellence in undergraduate science, engineering and technical programs

-establish a program of challenge grants to encourage and assist institutions to set instructional objectives, articulate needs and develop plans

INSTRUMENTATION AND FACILITIES

The Foundation has made substantial progress in identifying and meeting the research instrumentation needs of foundation-funded investigators. Now about 20% of total NSF research funds is allocated to the acquisition of research equipment. We commend the Congress and the Foundation for addressing the research equipment problem.

We must point out, however, that little progress has been achieved in meeting the needs of research institutions to replace and modernize laboratories in which national research programs are conducted. Federal investment in academic research facilities has declined almost 95 percent since 1965. The backlog of investment required to meet accumulated needs is unknown, but it clearly is in the multi-billion dollar range.

The White House Science Council has recommended that the National Science Foundation undertake a special ten-year research facilities modernization program. We are encouraged by the Council's recommendation. The characteristics of the problem, its seriousness and a federal responsibility to help fashion solutions are becoming more widely recognized. We also are encouraged that the Foundation, as directed by the Congress last year, is developing a capability to assess the problem in a comprehensive way. We hope that this Committee will urge the Foundation to give the facilities problem its sustained attention consistent with the recommendations of the White House Science Council.

MERIT-BASED ALLOCATION OF FEDERAL RESEARCH AND FACILITIES FUNDS

Finally, Mr. Chairman, we cannot emphasize too strongly the importance to the long-term health of the Foundation's research programs of resisting any attempts to earmark NSF funds for particular institutions for either research facilities or research project support. To date the Foundation has not been affected by the kinds of earmarking activity that has recently affected the Department of Defense, the Department of Energy and the National Institutes of Health. To its credit this Subcommittee has steadfastly protected NSF from the circumvention of established and effective merit review processes. We thank the Subcommittee, and we urge you to continue to sustain scientific and technical merit as the basis for the award of scarce federal research resources.

Eleven higher education associations, science and engineering societies have adopted statements that reaffirm the importance of merit-based allocation of federal research and research facilities funds. For your information, these statements are attached (ATTACHMENT).

I thank the Subcommittee for the opportunity to present these views.

[DRAFT January 13, 1986]

A RENEWED PARTNERSHIP

An examination of Federal Government-university-industry interactions in U.S. research and higher education in science and engineering.

White House Science Council Panel on the Health of U.S. Universities and Colleges

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Office of Science and Technology Policy

II. EXECUTIVE SUMMARY

On May 3, 1984, Dr. George A. Keyworth, Science Advisor to the President, asked the White House Science Council to examine how well our colleges and universities are prepared to produce the scientific and technical talent required for pre-eminence in an age of rapid technological change and intense international competition. He asked the Council to examine the basic health of our universities, as well as their relationship to industry and government, and to recommend measures to ensure that the most basic of America's advantages remains just that--an advantage in an increasingly competitive world.

In reply, the Council established the Panel on the Health of U.S. Colleges and Universities with representatives from the research community, both academic and nonacademic. This report is the result of their eighteen-month study.

OVERVIEW

Our university system remains unmatched in the world; we cannot, however, take its continued superiority for granted. To assess the system's future, the Panel asked the following

- Are our universities attracting the best students into science and engineering?
- Is the education received by today's students preparing them for the challenges of the 21st century?
- How well can our universities respond to changing demands?

The answers cause us concern, because they reveal the consequences of obsolete equipment, aging facilities, and growing shortages of students and faculty in important fields.

We are certainly not alone in recognizing that science and technology are critical to our future. Nations everywhere are investing in these capabilities. We conclude that we must rethink and, in many ways, rebuild the critically important interactions between universities, government, and industry that have served this nation so well in the past. The federal government-university relationship is too fundamental to the maintenance of our national science and technology base to be taken for granted, and the industry-university partnership is emerging as critical to exploiting that base in order to compete in the world marketplace.

One conclusion is clear: our universities today simply cannot respond to society's expectations for them or discharge their national responsibilities in research and education without substantially increased support. In 1984, only $8 billion of the nearly $100 billion in total national research and development was performed in universities, a level that simply does not reflect our dependence on the availability of the most able technical talent. An economy whose growth prospects depend upon maintaining a competitive edge in technology must look to an increasing--not decreasing--emphasis on the source of this technical talent.

The strength of the nation in trade, defense, and health has been directly related to past investments in science and technology. Our future position in global markets will similarly depend on our willingness to respond to opportunity and to mobilize our strengths today. To this end, we must promote a broad interdisciplinary approach to problem-solving by focusing on university-based centers that will improve cooperative linkages between scientists, engineers, and industry.

In the summary which follows, we present the Panel's major findings and recommendations. We believe that they demand the attention of the nation, and that if they are implemented, our universities will respond enthusiastically and effectively. Our present leadership in international science and technology is challenged; indeed, many consider it fragile and endangered. We are confident that the actions we recommend will allow us to retain this leadership. We cannot afford less.

FINDINGS

- A healthy university system is the basis for our future. In any ranking of priorities for allocating R&D support--both federal and private--universities must rank first.
- Demands for new talent and new knowledge have never been greater. Universities will not be able to respond to these growing needs without increased federal support. In particular, we encourage continuation of present administration policies to further increase basic research as a fraction of total national R&D funding.
- Of equal importance with the level of funding is the stabilization of federal support to permit more effective use of financial and human resources. The most ambitious research requires long lead times for preparation and incubation. Research groups are exceedingly fragile: once disbanded, they can rarely be reassembled. In the absence of stability and predictability, important opportunities have been lost, scarce resources have been used inefficiently and, most serious, some of the brightest young minds in each recent generation have been lost to science and technology.
- The universities themselves must share the responsibility for the deterioration of their health and capability. In attempting to ride out what were hoped to be temporary budget shortfalls, they mortgaged their research futures

too often using limited funds to maintain research personnel rather than investing in needed instrumentation or facilities. Moreover, research faculty members have themselves too often forgone high risk exploratory research which, were it to succeed, could have impressive payoff.

- State and local governments as well as private philanthropy, play a vital role. Their initial investments develop the structures and programs that make universities competitive for federal investment, and they provide resources by which academic institutions preserve their autonomy and diversity. Moreover, such support is a major element of the shared responsibility that typifies the present university-Federal Government partnership.
- The diversity of our college and university system is an essential element of its strength.
- In recognition of the leadership demands that our society will place upon them, it is essential that mechanisms be developed for early identification and support of our most able youth.
- Strong university-government-industry partnerships are fundamental to meeting our goals in economic competitiveness, national security, agriculture, health, and in improving the quality of life of our citizens.

RECOMMENDATIONS

A. To maintain the strong science base essential to our national future, we recommend that:

1. The Federal Government make substantially greater investments in our centers of learning in the 1980's and 1990's than in the 1970's. The recommendations set forth in this report, if they are to be implemented fully, require significant increases in financial support. The source of such funding in these times

of fiscal stringency is not obvious. Reallocation of R&D appropriations appears to be the most probable source, but we believe that incremental new funding will be required. In any case, we emphasize that this federal investment, at minimum, must keep pace with the overall national investment in R&D; at the current rate of growth it will double in ten years. More rapid growth is essential if our universities are to meet the burgeoning demands being made upon them from almost every sector of our society. The Federal Government is the only practical source of funding for the major part of this growth.

2. The federal government support a major initiative to establish university based interdisciplinary, problem-oriented research and technology centers directed to problems of broad national needs and relevant to industrial technology.
3. The federal government bear its full share of the cost of the university research it supports.

B. To build a solid partnership among the federal government, industry, and universities; to enable the university infrastructures to keep pace with research and educational needs; and to assure that the universities are able to pursue research and education effectively, we recommend that:

1. Federal policies recognize that university infrastructure (research facilities and equipment) costs are integral and, therefore, necessary parts of federally sponsored, university-based research costs.
2. The portion of federal research grants and contracts that reimburse universities for use or depreciation of facilities and equipment (use allowances) be based on realistic useful lifetimes;

a. Useful life of buildings and facilties should be reduced from the present level of 50 years to 20 years.

b. Useful life of equipment and instrumentation should be reduced from the present level of 15 years to 5 to 10 years, depending on the class of equipment.

These changes, which do no more than inject reality into the costs of doing research, will increase substantially the indirect fraction of total costs. This increase should not be drawn from direct research costs but from reallocation of funds from other sources.

3. To allow U.S. universities to restore their infrastructures in a timely fashion, a facilities fund be established within NSF for each of the next ten years. And that in order to encourage excellence:
   a. All proposals submitted to this facilities fund should be subjected to peer review within the scientific or technological community involved, and
   b. All awards from the fund should be made on a 50/50 matching basis with non-federal funding.
4. Any reorganization of the federal tax code recognize the importance of increased industry-university interaction. A 25% nonincremental tax credit should be established for industrial funding of university research and for industry-supported maintenance and servicing of university equipment. A tax deduction equal to the full market value of all industrially contributed equipment should be established.

C. To minimize controversy and friction concerning the reimbursement of indirect costs, we recommend that:

1. Reimbursements for administrative costs within the indirect cost category be fixed at a uniform percentage of modified total direct costs. That percentage should be determined by calculating the mean national percentage over a five-year historical period and should be phased in over a two-year period to allow those universities now charging more than the new fixed rate to plan for reduction. This change will eliminate any need for faculty effort reporting.
2. The formal requirement for cost-sharing be eliminated.
3. The paperwork burden associated with grant and contract administration, as perhaps best exemplified by the above mentioned requirement for faculty effort reporting--but much more pervasive--be reduced to a minimum.
4. All federal agencies supporting university research adopt the NSF practice of including the indirect costs in the project budget subject to peer review.

D. In order that the university environment be conducive to high-quality research and education; that it be attractive to the best minds; and to increase the effectiveness with which federal funding is used for research, we recommend that:

1. Federal agencies work toward an average grant or contract duration of at least three, and preferably five years.
2. Investigators be free to use up to 10% of their grant or contract support on a fully discretionary basis and be permitted to carry unexpended funds forward from one fiscal year to the next.

3. Federal agencies make greater use of block grants or contracts to support groups of investigators having shared research interests.
4. For greater flexibility, to facilitate changes in an investigator's field of research, and to support high-risk research, federal agencies, except in the cases of young investigators, place substantially more emphasis upon the research history of the investigator and less on the proposed research project in making awards.

E. To identify and educate our most talented youth more effectively, and to enable experienced scientists and engineers to continue to contribute their skills in a changing technological environment, we recommend that:

1. A substantial program of merit-based, portable scholarships be established by the federal government at the undergraduate level. Parallel programs should be established by industries having significant dependence upon university research and education. The national goal should be for the most able 1% of the undergraduate students in mathematics, engineering, and the natural sciences entering colleges or universities each year to be supported under these programs.
2. Substantial programs of multiyear merit-based fellowships, both federal and industrial, be established in science, mathematics, and engineering at the graduate level. Reflecting national needs, the field distribution of these fellowships would be expected to change over time.
3. Universities encourage interdisciplinary activities at the graduate level while retaining the essential

quality control function now played by the traditional disciplinary departments.

4. Industries and universities develop attractive continuing education programs for engineers and scientists that are matched to contemporary industrial requirements and to modern science and technology.

ASSOCIATION OF AMERICAN UNIVERSITIES

AAU STATEMENT ON DECISION MAKING IN FEDERAL FUNDING FOR RESEARCH FACILITIES

The Association of American Universities represents institutions whose faculties are deeply engaged in research. We share with many other institutions and individuals a commitment to advancing the quality of the nation's research effort. Since the vitality of this effort is closely linked to the soundness of decisions made about science by public bodies, it is both appropriate and important for the AAU to state its collective views about the ways in which those decisions are best made.

The United States has evolved an admirable but fragile system of awarding federal funds for research. In general, Congress appropriates funds for the support of broad categories of research. Subsequently, the administering federal agency issues guidelines for making applications in a manner that assures fair and open competition. Researchers then submit detailed proposals that are judged by experts, scientists chosen for their ability to make sound and careful judgments in the scientific area involved. This method maximizes the scientific return on the federal investment by assuring that awards are made on the scientific merit of the proposal and the professional merit of the proposer.

The same method governed most federal programs in support of scientific facilities when such programs existed. However, in the early 1970s, most federal government programs in support of the construction and renovation of research facilities ended. The subsequent decade-long failure to attend to the capital base of university science has led to a backlog of need that has hampered American science and placed great stress on the processes by which the government allocates scientific resources.

We believe that processes based on the informed peer judgments of other scientists need to be preserved and strengthened. We therefore urge scientists, leaders of America's universities, and Members of Congress to support the practice of awarding funds for the support of science on the basis of scientific merit, judged in an objective and informed manner. Further, we urge them to refrain from actions that would make scientific decisions a test of political influence rather than a judgment on the quality of the work to be done. These principles should apply in making decisions about scientific facilities as well as in awarding funds for research projects.

Finally, we urge officials of the national Administration and Members of Congress to deal promptly with the decay of the physical plant that houses much of the nation's basic research. S.1537, introduced by Senators Danforth and Eagleton, is a bipartisan effort to deal with this national priority and deserves strong and prompt support.

NATIONAL ASSOCIATION OF STATE UNIVERSITIES AND LAND-GRANT COLLEGES

STATEMENT ON FEDERAL FUNDING OF ACADEMIC FACILITIES

In recent years, federal funding of various higher education programs had decreased markedly. In particular, wholly inadequate resources for facilities has led some institutions to seek direct assistance from Congress. The outcome of such a process could be an irrational system of distribution based solely on political influence. In that regard, the National Association of State Universities and Land-Grant Colleges shares the concerns of the Association of American Universities, the National Academy of Sciences, and others, that this approach is unacceptable, in that it could diminish the capability of higher education to carry out its mission in education and research, and we urge Members of Congress and leaders of colleges and universities to refrain from this practice.

We further urge the Congress to fund Title VII of the Higher Education Act and similar programs in other agencies at reasonable levels, and to insure the systematic allocation of resources to satisfy pressing national concerns.

November 13, 1983

THE COUNCIL OF GRADUATE SCHOOLS IN THE UNITED STATES

RESOLUTION NO. 1

RESOLUTION IN DECISION MAKING IN THE FEDERAL FUNDING FOR RESEARCH FACILITIES

WHEREAS the United States has evolved an admirable but fragile system of awarding federal funds for research, and,

WHEREAS this system is dependent upon fair and open competition responding to federal agency guidelines, and peer review judgment by experts in the scientific area to be studied, and,

WHEREAS this method of peer review has governed most federal programs in support of scientific facilities when and where such program exist, and,

WHEREAS most federal programs to support construction and renovation of research facilities have been ended through a shifting of federal priorities, and,

WHEREAS in the absence of such programs colleges and universities are suffering a gradual increasing erosion in their ability to support state-of-the-art research in all scientific fields, and,

WHEREAS CGS member institutions share with many other institutions and individuals a commitment to advancing the quality of the nation's research effort. The vitality of this effort is closely linked to the soundness of decisions made about scientific research by public bodies.

NOW THEREFORE BE IT RESOLVED that the Council of Graduate Schools supports the recently adopted AAU Statement on Decision Making in federal funding for research facilities. CGS urges the national Administration and members of Congress to support the practice of awarding funds for research or facilities on the basis of scientific merit judged in an objective manner. CGS would further urge support for new spending authorities to support research facilities to keep our nation's investment in academic research facilities from becoming out of date.

Passed at the CGS 23rd Annual Meeting 12/83

MEMORANDUM FROM THE AMERICAN COUNCIL ON EDUCATION

TO: ACE Board of Directors

FROM: J. W. Peltason

SUBJECT: Proposed Statement on Federal Funding of Research and Instructional Facilities

DATE: January 9, 1984

Community concern has been generated by the recent attempts of several institutions to bypass the customary review process to obtain federal funding for research facilities. The Association of American Universities last fall issued a statement urging scientists, leaders of America's universities, and members of Congress "to support the practice of awarding funds...on the basis of scientific merit...(and) to refrain from actions that would make scientific decisions a test of political influence rather than a judgment on the quality of the work to be done."

Similar statements have been issued subsequently by the National Academy of Sciences, the National Association of State Universities and Land-Grant Colleges, and the American Association of State Colleges and Universities. The ACE Commission on Governmental Relations discussed this matter at its fall meeting, and recommended that the Board adopt the following statement:

"There is a pressing need for increased federal support for the rehabilitation of research and institutional facilities. Established procedures for these support programs involve a system of review to assure equitable consideration and the awarding of funds on the basis of merit.

"At a time when fiscal constraints have severely restricted many federal programs, it is especially important to sustain the process which assures systematic allocation of scarce resources. Therefore we call upon leaders of the academic community and members of Congress to reaffirm the principle of broadly representative review of project proposals in fair and open competition, so that funding decisions continue to represent the best interests of both higher education and the national welfare."

STATEMENT OF THE NATIONAL ACADEMY OF SCIENCES

FEDERAL FUNDING FOR RESEARCH FACILITIES AND INSTRUMENTATION

In recent months, there have been a few instances in which federal funding decisions for major university scientific facilities have not been subject to an appropriate review process. Informed peer judgments on the scientific merits of specific proposals, in open competition, should be a central element in the awarding of all federal funds for science.

In the past, such objective systems of evaluation have met the needs of our country well, and have contributed to the scientific preeminence of the United States. In the long term, they also help to maintain the pluralism that is important to the productivity of American science and is characteristic of political decision making.

We urge that the academic community and public officials exercise vigilance to protect this informed evaluation and decision-making process in the awarding of funds, not only for the support of scientific research proposals, but also for major scientific facilities and instrumentation.

October 30, 1983

NATIONAL SCIENCE BOARD STATEMENT

NSB Statement on Bypassing Merit Review in the Funding of Academic Research Facilities

Recent efforts by educational institutions to secure funding by appealing directly to Congress and bypassing the merit based review system represent the wrong solution to a real and urgent problem. The problem of deteriorating university research facilities threatens the health of the Nation's science and engineering base. To generate better solutions, the parties involved should meet to plan new initiatives that support university research without threatening the established science and engineering priority setting process that has served so well to promote excellence.

In the past two years, fifteen universities have bypassed that process and secured over $100 million for construction of facilities by appealing directly to Congress. In a number of cases, the funds were diverted from other scientific activities that had been selected on the basis of their merit.

The National Science Board has examined the implications of this development for the excellence and productivity of U.S. science and engineering, which today is the strongest in the world. As the challenge to America's competitiveness in defense and industry grows, so too does the Nation's reliance on its science and engineering strength. Bypassing the normal standards of scientific excellence through merit review procedures in science and engineering research jeopardizes this strength.

The problem is not yet severe, but the precedent has been established; lobbyists sense a source of funds, and each new circumvention increases pressure on schools that have so far resisted the temptation to pursue the same course. The question facing American universities today is this: Will they retain responsibility for the excellence of U.S. science and engineering, or will they cede it to purely political processes. The choice is in the hands of the science and engineering community. The trend is in the wrong direction.

The circumventions of merit review are being triggered by a serious problem: At many universities, facilities are deteriorating. Until this problem is addressed, the erosion of merit review will continue. A concerted effort -- by universities themselves as well as state and Federal Government -- to attack the facilities problem must be launched. For this, universities will indeed have to exert their political influence. But that influence must be directed at a long-term solution, not at the short-term and ultimately self-defeating steps of the past two years.

Too much is at stake to continue on the present course. As university facilities deteriorate, U.S. science and engineering will lose its grip on world leadership. If universities respond to deteriorating facilities by circumventing merit review, the decline in U.S. leadership will accelerate, and excellence will deteriorate into mediocrity.

To address these issues and to launch actions to solve them, the National Science Board:

a) Will continue to press the scientific community for strict self-regulation. It urges all professional societies, associations, academies, industry researchers, faculty and principal investigators to act in concert and support the peer review system.

b) Will evaluate the comprehensive merit review process, as part of a continuing process of scrutiny and improvement and as a reflection of the need to reassert the importance of the merit review system. Based on the evaluation, changes and improvements will be made, if required.

c) Calls for a Conference on Academic Research Facilities among the interested parties, to be sponsored by the NSB, the National Academies, and the Office of Science and Technology Policy. The conference should be held as soon as possible, utilizing talent from the financial community, Congress, state governments, federal agencies, academic institutions and business to define the problem and propose solutions.

RESOLUTION OF FEDERATION OF AMERICAN SOCIETIES FOR EXPERIMENTAL BIOLOGY

PEER REVIEW

"WHEREAS the peer review system has served in an exemplary fashion to promote the progress of biological science in this country, and

"WHEREAS federal support for research facilities through political decision-making rather than through peer review can be extremely disruptive of the orderly scientific process, be it

"RESOLVED that public officials move promptly to make federal money available in a more systematic way, through peer review mechanisms, to upgrade the biomedical research facilities of this country, and be it further

"RESOLVED that research scientists, research institutions, and public officials recognize the central need for open peer-reviewed competition for federal funds for research and research facilities, and refrain from circumventing the peer review process to achieve their goals."

May 23, 1984

RESOLUTION OF AMERICAN ASSOCIATION OF STATE COLLEGES AND UNIVERSITIES

WHEREAS, The 358 member institutions of the American Association of State Colleges and Universities (AASCU) are committed to fostering scientific research beneficial to our nation,

WHEREAS, Federal funds for research projects and facilities are traditionally awarded on the basis of their scientific merit judged in a fair and open competition,

WHEREAS, An equitable process of peer review at Federal agencies must be the guiding force in the awarding of funds for new scientific facilities and research projects,

WHEREAS, Recent efforts by some institutions have bypassed this preferred peer review process,

WHEREAS, Other scientific and educational associations have urged the reversal of these recent actions and an adherence to peer review procedures in all future scientific funding, be it

RESOLVED, That the American Association of State Colleges and Universities (AASCU) join with these other groups in reaffirming the principle that funds for the support of science be awarded on the basis of "scientific merit, judged in an objective and informed manner" by a panel of peers, and be it further

RESOLVED, That we urge scientists, educators and members of Congress to "refrain from actions that would make scientific decisions a test of political influence rather than a judgment of the quality of the work to be done." *

STATEMENT OF WILLIAM D. CAREY, EXECUTIVE OFFICER, THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

Senator GARN. The committee will come to order.

Our next witness will be William D. Carey.

Mr. Carey, please proceed. We will place your full statement in the record later.

Mr. CAREY. Thank you very much, Mr. Chairman.

I understand that you would like all of the witnesses to be very tight on their time. I will try to do that, too.

First of all, I would like to say that through the years, and I have been in this city now for some four decades, the Congress has been very generous in recognizing the Government's role in supporting scientific research. We want to thank this committee for its part. We depend very much on you.

NSF BUDGET COMMENDED

No. 2 is that the President's budget proposal for the Science Foundation which, I take it, is the subject of today's particular hearing, is to be commended. In the face of very acute budgetary problems it is a remarkable signal on the part of the administration, I think, a remarkable signal of confidence in the importance of scientific research and in engineering research at the very time that matters couldn't be tougher in terms of working out a budget.

There is an increase here over the current year. That is quite striking.

I think that what this would do if it is possible for the committee to go along with it, that it will be to stabilize the National Science Foundation's share of Government investment in basic science. This will allow some new investment in basic science. Not much, but some.

I very much hope that the committee will see fit to go along, because a slowdown or a cutback in the Foundation's share of basic research would, I believe, reverse the forward record of investment that both Houses of Congress have seen fit to support since the end of the great war.

BASIC SCIENTIFIC RESEARCH

Government is the chief source, as you know, Senator, of funds for basic scientific research in the United States. Out of a combined Government plus industrial expenditure this year on both research and development, this comes to roughly $120 billion. About 12 percent of that total is estimated to go for fundamental research.

Now without the Federal investment in the fundamental research, which is the greater part of what fundamental research gets in this country, the percentage of basic research would undergo a freefall to about 5 percent of this $120 billion total R&D expenditure of Government and private account included. That would be a very serious situation for the technology base for the United States.

This is a very important matter. The fact is that basic research support already is losing some ground relative to the rate of climb overall in budget authority for the total of federally funded R&D.

Over the 3 fiscal years, 1984 to 1987, the basic research percent of total R&D falls from 15.5 percent to 13.5 percent. They are pretty good numbers, but rough.

Now what is happening there is that support for development in the R&D budget of the Government has experienced a very rapid rate of climb which reflects the Government's requirements as the Government sees them. It is mainly in defense, as we know. But these sharp increases in development support are not being paced and not being paced with commensurate growth in basic research, the support of basic research. I don't know whether that is a problem as the committee sees it or if we are trying to look at how we deploy our public investment in R&D and how we look at the infrastructure.

I think that a 3-year trend of this kind indicating this kind of slippage is something that we do need to think about and try to at least stabilize and keep it from getting, from the gap from getting any greater than it is, Senator. I would hope that you and your staff would look at that.

Last, I guess that I particularly want to say that, while the Science Foundation budget, as the President has brought it up here, it is very impressive in its total and it is substantially impressive in its mix, there are those of us who feel that over a great many years now there has been insufficient investment in precollege science and math education. That part of the infrastructure is not in good shape. There is no real new initiative in the NSF budget. It is relatively level, with a range of $85 to $90 million. How much that you can do with that is a matter of judgment. The scale, however, relative to the dimensions of the problem is somewhat troubling.

CONTROLLABLE AND UNCONTROLLABLE ACCOUNTS

I am not really here to argue about the mix. I think the total is reasonable, sensible, positive and it is not reckless, certainly. If it can be sustained, that would be fine. But when you start looking, Senator, beyond 1987, and that is hard to do, but when you start looking to the outyears, when you start following the 5-year scenario of getting the deficit under control, and you get out to the last of the years to 1991 and look at the mix of controllable and relatively uncontrollable accounts, what you see is something troubling. You see the so-called other government sector of expenditures after you take out interest, after you take out the mandatory items, then you get to something that is called other government. What you see there is a steep falling off in the size of that fraction of the budget.

When I left the Bureau of the Budget, Senator, 15 years ago, I was assistant director there, we worried about the relatively controllable part of the budget was about 25 percent.

Based on the numbers that I have been looking at and that my staff and AAAS in looking at these R&D budgets, it appears that the other government's part of the expenditure budget is going to fall from about 14 percent in 1985 to about 7 percent by 1991. That means a big crunch on that sector.

Now, research and development, nondefense research and development, Senator, is estimated to take up about a quarter of that diminished 7-percent number.

Now, when this happens things like basic research, which doesn't really have a political constituency, gets into some competitive trouble. They are going to take an awful lot of heat, particularly from other groups who feel that their share of Government benefits has been diminished too much. They are going to look at what is going to make up a quarter, as much as a quarter, of a very low percentage of total expenditures.

Senator, if we are not very careful, I think that the security of Government's 40 years of investment in basic science as a trustee of basic science will be in a lot of jeopardy here.

I fully appreciate the problem that we have with the deficit. I used to be professionally involved in those problems. I think it is a question of how we sort out our particular priorities, what we do with the mandatory areas of the budget, how far we go in scaling our mega projects, some of which are in the area of high technology, have been traveling on science's passport, or how much we look at those. It is whether we decide that we can stretch them out, whether we can wait until after the deficit has reached a consensus point and is acceptable and then start up again. What's very much at risk in the outyears, Senator as I look at the situation, which is the survivability of the political consensus that has gone along this far with a quite generous support of basic science, Senator.

I think that concludes my statement, sir.

Senator GARN. Mr. Carey, thank you very much. We do appreciate your testimony.

Mr. CAREY. Thank you, sir.

Senator GARN. It has been very helpful to the committee, Mr. Carey.

Mr. CAREY. Yes, sir.

[The statement follows:]

STATEMENT OF WILLIAM D. CAREY, EXECUTIVE OFFICER, AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

My testimony will not take long, and I should like to preface my remarks with the observation that during the four decades of my experience in Washington, both in government and elsewhere, the federal government has given strong and impressive support to scientific research and development. The scientific community is, and should be, grateful to the Congress and especially to this Committee for that consistent support.

The result of these years of public investment, as we know, is a robust R&D system with no parallel eslewhere. The question we face now, with a difficult budgetary environment, is how to sustain and replenish this investment so that it continues to yield high returns. It is one thing to build such a remarkable system on a rising tide of resources. It is an entirely different thing to stay that course when every discretionary dollar seems to have a thousand claimants, most of them far more astute at the political arts than are scientists. We depend in a special way on the Congress to see to the health of science.

Today you are considering the budget proposals for the National Science Foundation. We are much encouraged to see that the administration not only spared the Foundation from a reduction in its budget but took pains to manage an increase of over 13 percent (nearly 10 percent in constant dollars), which is very helpful in stabilizing our investment in basic research and permitting a modest continuation of new investment. I hope very much that this Committee finds it possible and important to accept the budget proposals for the Foundation. While it is true that basic research is a "search and discovery" process which in hard times might seem amenable to stretchout or deferral, a slowdown would mean that we would search less and find less, and that we would take the first unhappy step backward from the bipartisan consensus that has kept government firmly committed through the postwar decades to the advancement of science. When we consider the new centrality of science to the mainline concerns of government for national security, international competitiveness, and industrial productivity, we can't fail to see that our technology base depends heavily on basic research. This is what provides the nutrition without which product and process innovations come to a quick standstill. If government ever did fund basic research for altruistic reasons, today it invests in it for unmistakably pragmatic reasons.

The most recent figures I've seen project total U.S. research and development expenditures this year, including industry's, in the neighborhood of $119 billion. By far the bulk of this is earmarked for applied research and for development, with only about 12 percent for basic research. If it were not for the federal investment, that percentage for basic research would experience a "free fall" to around 5 percent and our science would become the latest smokestack industry.

Where the National Science Foundation makes a critical difference in the national support system for basic research, in my view, is in the role of venture capitalist, moving selectively through the competitive proposal system to place its investment for long-term growth and yield, in contrast to the orientation of other federal agencies and most private corporations which angle their research support to their respective missions and goals. It is a significant difference, one that is focussed on balance, long lead times, and capacity building.

When the AAAS, each year, pulls together all the budget numbers for research and development, it's hard to miss anomalies in our patterns for support. Taking budget authority for R&D for the three fiscal years 1984-1987, we see total federal funds rising from $46.0 billion to $63.2

billion in the administration's budget -- a very rapid rate of R&D growth -- but the percentage in the same period for basic research has gone just the opposite way, falling from 15.4 percent of the R&D total to 13.6 percent. Put another way, basic research support is actually losing ground relative to the overall rate-of-climb in budget authority for R&D. I think this underscores the importance of keeping matters from getting worse, the importance in the present instance of appropriating fully for the NSF. What is happening, obviously, is that the steep increases to fund "development," largely in the Department of Defense, are not being paced by growth in basic research. This has the effect of creating an investment gap which, should it continue to widen as we tackle the tasks of deficit control, can set us up for serious downstream problems.

To me it is unsettling to see a process under way, which may continue for some years, in which our research and development assets are torqued systematically towards the development end of the spectrum while research support is scaled back severely in areas of agriculture, energy, health, and environment. This seems to say implicitly that we have decided that diversification of R&D investment isn't affordable now, that it will be even less affordable as the constraints bite deeper, and that the short-run approach is the only available one. Yet, we have few reservations about making multi-year open-ended commitments on future budgets for megaprojects having a great deal of uncertainty about them -- and the Strategic Defense Initiative, the space station, and the "Orient Express" high-speed airplane come readily to mind. These commitments, along with other candidates, will require tens of billions of dollars -- merging in the same time periods -- that must come from somewhere during the austere years that we are facing. Whether expenditures like these are likely to yield commensurable public and private benefits relative to their direct and "opportunity" costs has not yet been given much thought.

I realize, Mr. Chairman, that your immediate concern is to get out a budget for 1987. But I have to say that what happens in the not-so-far-off fiscal years 1988 through 1991, under our deficit control scenarios, is of real concern from the standpoint of securing our scientific strength. As you know, nondefense research and development live in the "relatively controllable" corner of the overall budget. This thickly populated margin, in the 1987 administration budget, has by now shrunk to only 9 percent. OMB's forward projections to 1991 indicate that this discretionary margin will drift on down to around 7 percent, and civilian R&D would take up nearly one-fourth of the available discretionary resources.

What I foresee is extreme competitive pressure on science under these circumstances, a threat to our continued willingness to reinvest sufficiently in science. If events take this course it will be no small task to keep government's partnership with science from being derailed. I hope very much that as your Committee works out its problems for 1987, you will be able to give serious thought to the structural straitjacket that we may be fitting ourselves into within three or four years.

This concludes my statement, Mr. Chairman. Thank you very much.

STATEMENT OF ANDREW M. GLEASON, HOLLIS PROFESSOR OF MATHEMATICS AND NATURAL PHILOSOPHY, HARVARD UNIVERSITY

Senator GARN. Is Mr. Andrew M. Gleason here?

Mr. GLEASON. Yes.

Senator GARN. Mr. Gleason is a Hollis professor of mathematics and natural philosophy at Harvard University. He is speaking here today on behalf of the Joint Policy Board for Mathematics.

MATHEMATICS EDUCATION BUDGET

Mr. GLEASON. Thank you, Senator.

Now, today I would like to try to present our interest in two different areas which have to do with the National Science Foundation.

Senator GARN. Yes.

Mr. GLEASON. The Joint Policy Board represents approximately 31,000 professional full-time mathematicians in this country.

In the first topic I think we are only part of the people whom I, in a sense, represent. That is, I wish to talk about the mathematics education budget.

In this the Joint Policy Board for Mathematics joins with several other mathematical societies of all levels and, as we shall see with several groups that aren't even formally thought of as mathematical here.

In recent times there has been formed a thing called the Mathematical Sciences Education Board at the National Research Council. The reason that we are bringing it to your attention is that a principal source of funding for this will be the National Science Foundation.

The board proposes to keep all of the interested parties in mathematics education in one place, so to speak, so as to get communication between all of the various groups. The groups were very wide. I refer to the fact that aside from the professional mathematicians, there are the teachers of mathematics. There are the principals' associations. We have members on this board from State education boards, State commissioners of education, and every group that you can imagine, including someone from the National Parent-Teachers Association.

So this is a very large board. It proposes to keep track of what is happening in mathematics education from kindergarten to college ultimately.

Now they are presently involved in testing, examining the effects of testing of the standards which have been imposed in many places, and often without as much thought about what is being said or should have been. It is also about matters of curricular development, teacher development, and international comparisons. It is a whole gamut of things which affect the education of our children with respect to mathematics.

We have received support from the National Science Foundation. They are, as I say, a principal supporter of this operation. It is in that sense that we would hope that you would provide the funds to those people to help us with this project.

So I would like to recommend in this context that this subcommittee should not only provide those funds, but, to some extent, to try to monitor the question of whether or not that board is being properly supported by the National Science Foundation.

As yet, I wouldn't want to say that we complain, nor would I say that we are well off. We are just getting started. We can't really say where we are. We do feel it is a very important initiative on behalf of the whole mathematical community as well as all these expert groups.

UNDERGRADUATE EDUCATION

We are also concerned with undergraduate education. We feel that the most important thing at the moment in that area might be the introduction of competitive faculty fellowships which would help the people who wish to devote time to advancing and changing the mathematics curriculum at our colleges. There is not enough money available for that sort of thing for individual faculty members. There is, perhaps, too much of a tendency to provide big projects and not enough perhaps to support individual initiatives which are available, in fact, on many campuses.

MATHEMATICS BASIC RESEARCH

Next I would like to turn to the other aspect of what I'm here talking; namely mathematics basic research.

In 1984 a report came from the National Research Council entitled, "Renewing U.S. Mathematics—Critical Resource of the Future."

The committee that prepared this report was chaired by Dr. Edward E. David, formerly the President's Science Adviser. The committee consisted of a large group of mostly nonmathematicians.

After they studied the matter for approximately a year, they came out with a report in which they stated that the decline for Federal support for mathematics research in the late 1960's and to the 1970's was serious. It was largely unnoticed because it seemed to be that mathematics support was aggregated with other things, particularly with computer support and the large rise in computer expenditures masked the relative nonrise for mathematicians. The funding remained roughly level in dollars and down in constant dollars.

The present shortfall that is estimated on Federal support for mathematics research is about $90 million per year. At the moment, the sources of support for mathematics research from the Federal Government was 94 percent from two agencies; namely the Department of Defense and the National Science Foundation. Fifty-four percent of all the money on Federal support for mathematics is from the Science Foundation itself.

So there is a major problem for support which is directly in the agency that we are talking about, the National Science Foundation.

The effect of this, if we do not deal with this problem, can be extremely serious. I want to point out to you that every high tech thing which we do, every high tech device that you can imagine these days, all of which we point to proudly, depend to some extent on some aspect of mathematics. Many times it is on new mathematics, which wasn't even known until these devices were started.

I am going to mention just a few. Computers is an obvious one. There is air foil design and image-enhanced communication which enables us to communicate with satellites. The modern inventory control theory, scheduling, and so on in our factories. All of these things depend on mathematics which have been developed mostly in this country over the last 30 or 40 years.

Now if we don't continue to support mathematics research we may not have the equivalent of these breakthroughs which have saved our economy huge sums of money. It is extremely important that we maintain our capability in basic mathematics research, Mr. Chairman.

MATHEMATICS RESEARCH PROGRAM

The National Science Foundation has been making efforts to improve its support of mathematics in the last few years. In fact, the Director has announced that, with the permission of your committee, he is protecting the mathematics research budget from the Gramm-Hollings budget cuts.

We want to express our appreciation for giving him the permission to arrange this.

We would like then finally to urge that the subcommittee continue to support and augment the Mathematics Research Program at the National Science Foundation. Mathematics is an absolute foundation discipline. It is often in terms of the projects I mentioned a small monetary consideration. But its part is absolutely vital and it is very important, I believe, that we should continue to maintain a high level of our mathematics research in this country.

Thank you very much for the opportunity to speak today, Mr. Chairman.

Senator GARN. Thank you, Mr. Gleason.

Mr. GLEASON. Yes, sir.

Senator GARN. Your full statement will be made part of the record.

Mr. GLEASON. Thank you.

[The statement follows:]

STATEMENT OF ANDREW M. GLEASON, HOLLIS PROFESSOR OF MATHEMATICKS AND NATURAL PHILOSOPHY, HARVARD UNIVERSITY, ON BEHALF OF THE JOINT POLICY BOARD FOR MATHEMATICS

The Joint Policy Board for Mathematics (JPBM) is pleased to present testimony to the Subcommittee on HUD-Independent Agencies Appropriations of the United States Senate on the fiscal year 1987 appropriation for the National Science Foundation.

The Joint Policy Board for Mathematics is an executive policy board of the American Mathematical Society, the Mathematical Association of America, and the Society for Industrial and Applied Mathematics, professional associations representing the mathematical research, undergraduate teaching, and industrial and applied mathematics communities. The combined membership of these three organizations is 31,000, and includes most of the active mathematicians in this country. The Joint Policy Board works closely with the Conference Board of the Mathematical Sciences (CBMS), which represents all sectors of the mathematical sciences community [1].

The HUD-Independent Agencies Appropriations Subcommittee is now reviewing the fiscal year 1987 appropriation of the National Science Foundation (NSF). Over 50% of the total federal support for mathematics research comes from the National Science Foundation, as does a significant percentage of support for innovation in mathematics education. Therefore, it is fitting that the mathematics community takes this opportunity to present its concerns and recommendations on federal support for mathematics.

MATHEMATICS AS A FOUNDATION DISCIPLINE

Mathematics is the foundation discipline that makes progress in most fields of science and technology possible. This foundational role derives from two facts: (1) mathematics is the science of order--whether that order governs quantity, shape, arrangement, or form; and (2) the real world is the very epitome of a complex situation in which a great deal of order can be seen, if one has appropriate concepts for describing that order. The unique role of mathematics in science, technology and society more broadly is played through both education and research.

Over 25 million young people study mathematics every weekday in the nation's elementary and secondary schools. This is principally because:

- Mathematics is an important part of the preparation for functioning as an adult in our society, so much so that mathematics education begins in the first grade and continues systematically into the secondary level;

- High school and early college mathematics form an essential part of education for any of a broad spectrum of technical careers, and are necessary for the rudimentary grasp of science needed by all college graduates.

It is not widely appreciated that, for most of the theoretical aspects of science and engineering, mathematics is the very language in which the theory is described. The noted physicist, Richard Feynman, has said that one who would understand nature must be conversant with the language in which nature speaks to us. He had in mind mathematics, the language of order.

Those who would be scientists, engineers, mathematicians, computer scientists, economists, or the like, must understand theory and therefore must study mathematics through most of their collegiate years:

- Advanced college mathematics is an essential part of the basis for becoming a scientist or engineer in today's world; for would-be theoretical scientists, mathematics education continues into graduate school.

But the idea of a language necessary for describing things conveys only part of the picture, as does the idea of a foundation based on learning known mathematical methods.

There is an equally important, yet far less visible, way in which mathematics is a foundation discipline. It is this: Progress in science and technology depends in an essential way on the continual discovery of new mathematics. That is, such progress depends on the continued vitality of research in the mathematical sciences [2]. This is seen, for example, in the frequency with which Nobel prizes are awarded to scientists for work which depended heavily on sophisticated mathematical concepts and methods discovered only a few years before [3]:

- The products of mathematical research form the foundation on which science and technology advance--it is a living foundation, one which grows hand-in-hand with science and technology.

The National Science Foundation supports both mathematics education and mathematics research. Therefore, the condition and needs of both are addressed in this testimony.

I. MATHEMATICS EDUCATION

Mathematics is necessary for all citizens who will live and work in the twenty-first century. Mathematics is both an enabling force and a critical filter for careers in science and engineering. Without quality education in mathematics, we cannot build programs in science and engineering. The National Science Foundation policy for science and engineering education -- both precollegiate and collegiate -- must be built on this central fact: Mathematics is not just one of the sciences, but is the foundation for science and engineering.

A. ELEMENTARY AND SECONDARY MATHEMATICS EDUCATION

The crisis in mathematics and science education at the elementary and secondary level has been well documented in the past few years. Local, state and federal surveys report alarming statistics indicating that American student achievement in mathematics lags behind their international counterparts beginning early in elementary school and continuing into the undergraduate level.

This shortfall in student growth in mathematics points to an overall unpreparedness of our society to deal with the inevitable changes that increased technology in the work place will bring. It may seriously handicap our future natural and physical scientists, engineers, computer scientists, industrial technologists, economists, statisticians, and others dealing with quantitative information.

The mathematics research community joins with the mathematics education community to express concern about this grave situation. The mathematical sciences community acknowledges the importance the Congress places on quality mathematics and science education. With the passage of the

Education for Economic Security Act has come increased opportunity for targeting the problems that erode quality mathematics education.

A NEW INITIATIVE IN EDUCATION

The whole of the mathematical sciences community, through the Conference Board of the Mathematical Sciences, has exercised leadership to complement the Congressional action taken in this area. In the spring of 1985, a proposal was submitted to the National Research Council [4] urging the establishment of the Mathematical Sciences Education Board (MSEB). The National Research Council has since adopted the proposal and established the Board.

Members of the Senate HUD-Independent Agencies Appropriations Subcommittee may find the Mathematical Sciences Education Board to be an exciting new development on the elementary and secondary education horizon, for several reasons.

First, the MSEB is an excellent example of partnerships involving not only **educators** at all levels (i.e., classroom teachers, school administrators, undergraduate instructors, and research mathematicians), but also **parents, business and industry, and government** at all levels (i.e., local, state, and federal). The thirty-four member Board broadly represents each of these sectors [5].

Second, the primary purpose of the MSEB is to provide a continuing national overview and assessment capability for mathematics education. This will be done through projects and activities of Board task forces, to which experienced educators and representatives from other sectors of the Board's membership will be appointed.

Third, and perhaps most important, is the answer to why a Board is needed. The educational reform movement of the post-Sputnik era was far less helpful than it might have been. Millions of dollars were spent to improve mathematics and science education. But the stop-gap nature of these efforts meant that once the first level of the problem was dealt with, both public and financial support began to wane.

The Board is designed to provide a continuing capability to support mathematics education well into the next century. The evolution of education--particularly mathematics education, which must change to prepare students to live and work in a high-technology society--must be viewed as a continuing process. Our rapidly evolving society will always have education problems. The Board is committed to providing a substantive overview of progress and problems in mathematics education and to continuously injecting the best ideas into the system.

BOARD ACTIVITIES

Since the appointment of members by the National Research Council last August [1985], two meetings of the full Board have been held, and an initial agenda has been established covering the following critical areas: influence of testing on mathematics education; standards and indicators of excellence in mathematics education; professional education of mathematics teachers; implications for the United States of international studies of mathematics education; and mathematical sciences curricula.

The work products that will come from the Board will be useful:

- To state legislators who seek assistance in setting standards for mathematics education;

- To classroom teachers who need information about classroom instruction in mathematics, and who seek development opportunities to improve their own teaching capabilities;
- To parents who want to help improve the quality of their local school system, but often lack the resources and support to do so;
- To business and industry who recognize that today's student is tomorrow's employee, and who seek avenues to assist in the education of students and support of teachers.

These are a few ways in which the Board can be of practical assistance to the mathematics education infrastructure.

It is important to note that the Board's activities are not a collection of individual projects. They are much more than that. A critical function of the Board will be to coordinate and synthesize its activities in testing, standards, curricula, and so forth. In this way, the Board's efforts will begin to address some of the issues that have fallen between the cracks in the 'single project' approach to mathematics education.

It is envisioned that the Board will provide coordination and continuity by working with the broad base of its membership. The Board is a unit through which the greater mathematical education partnership can act and react to bring about sustained improvement and continuous quality in mathematics education.

RECOMMENDATION: The Joint Policy Board for Mathematics recommends that the Senate HUD-Independent Agencies Appropriations Subcommittee monitor the progress of the Mathematical Sciences Education Board. This can be done through direct contact with the Board [6] or through the Committee's oversight of the National Science Foundation, which is a primary source of federal funding for the Board. The Joint Policy Board believes that the Mathematical Sciences Education Board is a unique undertaking of national significance. The Board's emphasis on partnerships distinguishes it from other national efforts that are developed by only one community or designed to address only one issue. The Board is a partnership of effort among several groups and a partnership of intellect linking several issues critical to mathematics education.

HIGH SCHOOL STUDENTS OF OUTSTANDING CAPABILITY

In addition to the concern expressed above for strengthening mathematics education for all students, the Joint Policy Board for Mathematics has a special interest in students who demonstrate outstanding mathematical ability. Each year the National High School Mathematics Examination system identifies the best mathematics students in grades 9-12 through a series of nation-wide competitive examinations. Approximately 600,000 students take the first stage exams. Eventually the top 25 students are invited to a three-week training session, and five students then represent the United States in the International Mathematics Olympiad.

The effectiveness of this screening and training process is attested to by the record of the United States in the International Mathematics Olympiad: in 8 of the last 10 years the U.S. team has placed in the top three, twice coming in first.

However, no support structure currently exists to enhance the mathematical education of the thousands of students who demonstrate truly superior mathematical talent by their high scores on this examination. By not following-up with appropriate support programs, we waste precious national resources.

> RECOMMENDATION: The Joint Policy Board for Mathematics recommends the establishment by the National Science Foundation of summer training institutes in each state for students who have achieved outstanding scores on the national mathematics high school tests (or other comparable measures). These institutes would be offered by schools, colleges or universities and staffed by teachers with experience in teaching mathematics and mathematical problem solving to extremely talented students, typically the top 1-2 percent of the students in each state.

The program could be administered by the National Science Foundation by asking for competitive proposals from educational institutions in each state, or it could be administered under the jurisdiction of the Committee on American Mathematics Competitions, the committee of the Mathematical Association of America that administers the national high school examinations. Such a summer institute program could be administered annually in every state for a total of $3-5 million. Total outreach would be 2,500 students annually.

Such a program would provide important support for the continuing development of high-performing young people. This effort is necessary if we hope to replentish the mathematics manpower base.

B. UNDERGRADUATE MATHEMATICS EDUCATION

The relations between mathematics and science have always been close. But because computers make possible mathematical analysis of many scientific and engineering processes, these relations are now both more pervasive and more significant than ever before. Whereas in the past only theoretical science required advanced mathematics, today all science-based fields use sophisticated mathematical models.

This suggests a fact that is important for the undergraduate curriculum: Mathematics is changing dramatically in content, in scope and in application; it is not only being applied, but is being continually created. .

Collegiate mathematics stands at the interface of educational and research issues in mathematical sciences. The mathematics faculties of our colleges must provide courses for:

- future scientists and engineers,
- prospective elementary and secondary school teachers,
- strong majors for those intending to enter graduate school,
- remedial courses for those entering college unprepared in mathematics,
- general education courses for students not majoring in a scientific discipline, and
- a variety of service courses ranging from elementary statistics to advanced operations research.

Moreover, in most institutions, mathematicians also teach some computer programming and elementary computer science.

SIGNS OF STRESS IN OUR COLLEGES

The future quality of our nation's science and technology depends on the ability of today's mathematics faculties to meet these diverse obligations. Exciting developments in the mathematical sciences resonate with creative ideas for curriculum innovation to provide challenging opportunities in undergraduate mathematics. Yet the record of the recent past suggests that our mathematics faculties are under great stress, and are increasingly unable to meet national needs in collegiate mathematics.

The following statistics attach some quantifiable measure to that stress:

- Demand for undergraduate mathematics courses has doubled since 1970, but during that same period the nation's college mathematics faculty has increased by only about 50 percent.
- Each term three million students receive mathematics instruction from about 30,000 faculty members. Despite this record demand for mathematics courses, the number of students majoring in mathematics has declined by over 50 percent and advanced (i.e., post-calculus) enrollments have declined from 20 percent to 5 percent of mathematics enrollments.
- Approximately three quarters of all mathematics credits awarded by colleges and universities are for courses more appropriate to the secondary school curriculum.

Other signs of stress are harder to quantify, but no less real. Mathematics departments, with few exceptions, do not have adequate access to computing resources that are appropriate to the actual use of mathematics in today's scientific and industrial world. As a consequence, computing has had very little impact on the mathematics curriculum--neither on what should be taught nor on how it is taught. In this age, undergraduate mathematics needs to be conducted in active symbiosis with powerful computers--for symbolic manipulation, for graphical display, for numerical analysis and for simulation.

RENEWAL OF COLLEGIATE MATHEMATICS

Inevitably, the availability of computers and the demand for new applications compels us to rethink priorities for mathematics education at all levels. To prepare students adequately for their careers in the twenty-first century, undergraduate mathematics programs must include core principles of computer science (algorithms, data structures, complexity theory); a contemporary view of numerical methods and approximation techniques; robust, computer-intensive statistical methods; graphical techniques for exploratory data analysis; and computer algorithms for optimization problems.

Unfortunately, in far too many departments, mathematics courses are dated both in spirit and in content--primarily because faculty have not had sufficient opportunity for professional development.

> RECOMMENDATION: Revitalization of undergraduate mathematics will require programs in colleges across the country that are closely linked to the frontiers of pure and applied mathematics. The key to revitalization of collegiate mathematics is a faculty that is intellectually alive. What matters most is that the faculty develop an environment in which students can encounter mathematics as a living, growing discipline.

The Joint Policy Board for Mathematics recommends that the National Science Foundation establish a program of competitive Faculty Fellowships sufficient in number to invite large numbers of applicants and sufficiently varied in purpose to promote a wide variety of accomplishment: curriculum development, student projects, professional travel, research support, computer needs. Such fellowships should be specifically targeted for projects that seek the improvement of undergraduate education. They would make a major impact on professional development of the collegiate mathematics faculty across the nation.

The mathematics community itself has recognized the need for coordinated action to address the basic issues in mathematics education. The creation of the Mathematical Sciences Education Board at the National Research Council grew out of this recognition. The mathematics community has also presented to the National Research Council a proposal that the Mathematical Sciences Education Board and the Board on Mathematical Sciences [7] jointly undertake an in-depth review of the nation's collegiate mathematics enterprise. Out of this should come other recommendations for improving collegiate mathematics, including recommendations concerning roles for the National Science Foundation, the mathematical community, the nation's colleges, business and industry appropriate in this era of fiscal stringency.

II. MATHEMATICAL RESEARCH

It is well understood that such important goals as national security, economic strength, and the quality of life are increasingly linked to our success in introducing new technologies that have been made possible by recent scientific advances. It is less fully appreciated that scientific progress is stimulated by advances in mathematics, which defines the foundations of the sciences.

A few years ago the National Research Council established an ad hoc Committee on Resources for the Mathematical Sciences to look into the health and support of fundamental mathematics research in the United States. The ad hoc Committee, chaired by Dr. Edward E. David, Jr., former science advisor to the president and then-president of Exxon Research and Engineering Company, found support for mathematical research in an alarming state--hence the title of its report, Renewing U.S. Mathematics: Critical Resource for the Future [8].

KEY FINDINGS OF THE AD HOC COMMITTEE

The most significant finding of the Committee will not seem novel. But it goes far toward explaining how mathematics funding came to its present state: There is today a widespread misunderstanding and under-appreciation of the role of mathematics in scientific and technological progress.

Even among sophisticated observers of science and technology, there is a tendency to believe that the necessary mathematics already exists and needs only to be applied. That the creation of new mathematics is a vital part of scientific and technological advancement often escapes attention.

New mathematics is central to the design of high density integrated circuits, the design of information networks, and the design of solution procedures without which even our fastest computers would be ineffective.

It is used in advanced technologies for finding oil, for enhancing production from existing oil fields, and for creating new chemical and oil refining processes. It is vital to the defense effort, and it will become more so, particularly in such ambitious undertakings as the Strategic Defense Initiative.

The point is that mathematics research is essential to progress in many scientific and engineering disciplines. And the outlook is for this to be so for more and more fields, a trend being accelerated by parallel advances in instrumentation and computing.

SPECIFIC FINDINGS OF AD HOC COMMITTEE

What did the ad hoc Committee find about the state of mathematics? What did it recommend? What has happened since the report was issued twenty-two months ago?

The specific findings of the ad hoc Committee can be summarized as follows:

- Constant dollar federal support for mathematics research declined by over 33 percent in the fifteen year span from 1968-1972;

- This has left mathematics research support markedly out of balance with support for related fields of science and technology;

- Given the central role mathematics plays in all these fields, this imbalance will seriously weaken the nation's technological effort unless it is corrected. Clear signs of its negative impact on university mathematics centers abound;

- It will require an additional federal investment of at least $100 million per year (in 1984 dollars) to restore balance. This increase should be accomplished over a three-to-five year period.

HOW BAD IS THE IMBALANCE?

The chart in Appendix II provides a comparison of federal support in institutions of higher education for three fields of science in 1980. These figures make manifestly clear the kinds of imbalances that had developed between mathematics and other fields of research by the start of this decade:

- There were just as many mathematicians in colleges and universities in the United States as physicists or chemists. Yet only about two-thirds as many mathematics faculty received federal research support.
- Only a small percentage of the graduate students were federally supported, as compared to large percentages in chemistry and physics.
- And look at the postdocs--50 in mathematics, compared to 1,200 in physics and 2,500 in chemistry!

HOW DID SUCH AN IMBALANCE COME ABOUT?

The ad hoc Committee's report gives a thorough explanation of the historical events which led to the existing imbalance between support for mathematics research and support for related fields of science and engineering. There were three critical events:

- Mathematics research support has long been heavily concentrated in just two federal agencies -- the Department of Defense (DOD) and the National Science Foundation. When the Mansfield Amendment and its pre- and after-effects caused DOD to drop nearly all its support for core mathematics research in the late 1960's and early 1970's, the NSF did not take up any of the slack.

- When dramatic reductions in federal science fellowships occurred in the early 1970's, no compensating increase occurred at the NSF in research assistantships for graduate students in mathematics, as happened in other fields of science.

- After these two events, in which one-third of the constant dollar support of the mathematics research enterprise was eliminated, the NSF and DOD budgets for mathematics stayed flat (in constant dollars) for the decade 1973-1982. This fact largely escaped notice because mathematics was lumped together with computer science in federal data. In the aggregate figures, rapid growth in computer science masked the flat support for basic mathematics.

AD HOC COMMITTEE RECOMMENDATIONS

To begin correcting this situation, Renewing U.S. Mathematics: Critical Resource for the Future makes some conservative recommendations -- even though it did call for more than a doubling of support over five years. The increases would come from a low base -- from $80 million per year in 1984 (in 1984 dollars) to $180 million per year (in 1984 dollars) at the close of five years.

PROGRESS IN RECENT YEARS

In an unprecedented action taken in December, 1984, the National Science Board (NSB) formally commended the ad hoc Committee for its "timely and compelling report." Furthermore, the NSB noted the importance of balance in support for scientific and engineering disciplines, "especially where a specific field, such as the mathematical sciences, affects much of the scientific, engineering and technological enterprise of the nation." It then adopted this resolution:

> RESOLVED, that a concerted effort should be made by all funding agencies to increase support for the mathematical sciences for several years until a proper level of sustaining support has been achieved.

In the last three years there has been important, but still insufficient, progress toward meeting the goal of restoring balance.

At the National Science Foundation, the effort began early in 1983 and has continued under the determined leadership of Erich Bloch. His most recent act was to obtain approval for reprogramming which exempted mathematics from the fiscal year 1986 Gramm-Rudman-Hollings budget cuts. The foci for renewal at the Foundation have been:

- Increased support for graduate students and postdoctorals, to address the severe manpower problems which mathematics now faces;

- Increased emphasis on computational mathematics.

The National Science Foundation is now supporting over 600 graduate students and 200 postdocs in mathematics, as contrasted with numbers which were almost zero a few years ago. These figures still pale beside analogous figures for physics or chemistry, but there is progress.

A major initiative in computational science and engineering has been started at the National Science Foundation, with an important role for computational mathematics. The Joint Policy Board for Mathematics supports the initiative and has a strong interest in continuing a dialogue with Congress as well as the National Science Foundation about the evolution of the initiative.

At the Department of Defense, which together with the National Science Foundation accounts for 94 percent of federal support for mathematics research, increases in each of fiscal years 1984 and 1985 of roughly 10 percent were to have been followed in fiscal year 1986 with a 30 percent increase. A significant part of this projected fiscal year 1986 increase was the addition of a new mathematics program at the Defense Advanced Research Projects Agency (DARPA).

The Gramm-Rudman-Hollings budget cuts will reduce the projected fiscal year 1986 increase of 30 percent to 10 percent, which will have the effect of reducing the numbers of individual research grants at the military service agencies. This will be the result even if the Department of Defense's University Research Initiative and Strategic Defense Initiative offset part of the reduction.

FEDERAL SUPPORT: SHORTFALL IN PRESENT LEVELS

The chart in Appendix III shows the total federal support for mathematical research at $90.5 million in fiscal year 1985, the last year for which there are firm numbers. Fiscal year 1986 appropriations totalled $105 million before the impact from Gramm-Rudman-Hollings was felt at agencies other than the National Science Foundation.

Allowing for inflation, federal support for mathematics is still more than $90 million (in 1986 dollars) short of the support levels recommended by the National Research Council's ad hoc Committee. Support has been growing, but at only about half the rate necessary. Next year at this time, a more detailed assessment of what has been achieved in terms of balance between support for mathematics and support for related fields should be possible.

MATHEMATICS MANPOWER PROBLEM

We do know that the manpower situation in mathematics is actually worse than it was two or three years ago. Ph.D. production has dropped again, from about 800 per year to about 750 per year. There is an annual shortfall of about 150 Ph.D.'s available to fill full-time faculty positions at the four-year institutions. As existing faculty age, retirement rates are accelerating. Demands for sophisticated computational applied mathematicians are rising sharply.

This does not bode well for renewal of the field, but there are signs of hope. Preliminary data of the undergraduate survey conducted every five years by the Conference Board of the Mathematical Sciences show that the number of undergraduate mathematics majors is on the upswing again. If the effort to increase support for graduate students and postdoctorals is continued in the years ahead, we should be able to attract and develop the talent necessary to renew the country's mathematical research effort.

> RECOMMENDATION: The Joint Policy Board for Mathematics urges the Senate HUD-Independent Agencies Appropriations Subcommittee to support and augment the increases in mathematics funding being undertaken by the National Science

Foundation. Mathematics is a foundation discipline. This means that mathematics should be central to deliberations about science policy. When setting priorities and authorizing funds for science and technology, the Congress should ask what portion of those funds supports the foundation discipline, mathematics. Congressional support is essential if we are to restore this vital field to health in the next decade.

The Joint Policy Board for Mathematics appreciates the opportunity to present testimony before the Subcommittee on HUD-Independent Agencies.

FOOTNOTES

1. The mathematical sciences community comprises thirteen professional math~~ematic~~al associations, whose presidents regularly meet under the auspices of the Conference Board of the Mathematical Sciences to discuss policy goals and options.

These organizations are: American Mathematical Association of Two-Year Colleges, American Mathematical Society, American Statistical Association, Association for Symbolic Logic, Association for Women in Mathematics, Institute of Mathematical Statistics, Mathematical Association of America, National Council of Supervisors of Mathematics, National Council of Teachers of Mathematics, Operations Research Society of America, Society of Actuaries, Society for Industrial and Applied Mathematics, The Institute of Management Sciences.

2. The "mathematical sciences" research community includes: *pure mathematicians*, who create the discipline itself; *applied mathematicians*, who develop mathematical tools, techniques and models to understand scientific phenomena or solve basic technological problems; *statisticians*, who develop and apply mathematical techniques to analyze and interpret data for use in inference, prediction, and decision-making; *mathematicians in operations research* who develop and apply optimization techniques to management and decision-making; *mathematical specialists in fields of engineering* (e.g., communication and control theories); and *mathematical biologists*, *mathematical economists*, and others.

Computer science has a significant intellectual overlap with the mathematical sciences. However, it is not now included in discussions of funding support for the mathematical sciences because it has its own sources of funding.

3. It is not a coincidence that the two most recent recipients of the Nobel Prize in chemistry are members of the American Mathematical Society.

4. The National Research Council is the principal operating arm of the National Academy of Sciences and the National Academy of Engineering in Washington, D.C.

5. See Appendix I for an annotated membership list of the Mathematical Sciences Education Board.

6. The Mathematical Sciences Education Board is chaired by Dr. Shirley A. Hill, Professor of Mathematics and Education at the University of Missouri in Kansas City. Dr. Marcia Peterson Sward is Executive Director of the Board. The Board offices are located at the National Academy of Sciences, 2101 Constitution Avenue, N.W., Washington, D.C.

7. The National Research Council established the Board on Mathematical Sciences in December, 1983. The program of the Board on Mathematical Sciences is designed primarily to undertake studies involving pure mathematics, applied mathematics, and statistics.

8. This report was published by the National Academy Press, Washington, D.C., June, 1984.

THE MATHEMATICAL SCIENCES EDUCATION BOARD

Appendix I

DR. SHIRLEY A. HILL, Chairman
Professor of Mathematics & Education
University of Missouri-Kansas City

MAA, NCTM, AMS,
AAUP, ASL*

Shirley Hill has an extensive background in mathematics and education. She has taught in the public schools and at the university level. Dr. Hill's experience as a national leader in mathematics education and knowledge of grass roots problems in mathematics instruction bring a unique combination of strengths to the leadership activities of the Mathematical Sciences Education Board of the National Research Council.

MR. GORDON M. AMBACH
Commissioner of Education
State Education Department
State of New York

CCSSO

Gordon Ambach is the 1984 - 85 president of the Council of Chief State School Officers, and has served as Commissioner of Education in New York State since 1977. Mr. Ambach's long involvement in educational activities as a teacher and in educational governance and policy lends a solid view of the problems and needs in mathematics instruction from the perspective of the state educational agency.

DR. J. MYRON ATKIN
Dean, School of Education
Stanford University

AAAS, AAUP, CESI,
AERA, NARST

Myron Atkin has degrees in science education and chemistry, and has participated extensively for several years in science education policy development at the national and international levels. Recently, he has been active on the Task Force on the Teaching Profession of the Committee for Economic Development, the Advisory Committee for Science and Engineering Education of the National Science Foundation, and the National Panel on the High Schools of the Carnegie Foundation for the Advancement of Teaching.

DR. DAVID BLACKWELL
Professor of Statistics
University of California-Berkeley

IMS, ASA, AMS,
AAAS, NAS

David Blackwell is a research mathematician whose work is concentrated in probability and statistics. He is a member of the National Academy of Sciences and has received the ORSA-TIMS von Neumann Theory Prize. Dr. Blackwell has held positions of leadership in several mathematics and statistics professional associations.

MS. GAIL F. BURRILL
Chair, Department of Mathematics
Whitnall High School
Greenfield, Wisconsin

NCTM, NCSM

Gail Burrill teaches mathematics in the urban Whitnall School District, where she has taught grades 5 - 12. Ms. Burrill is a recipient of the 1985 Presidential Award for Excellence in Mathematics Teaching. She has participated in the Woodrow Wilson National Teaching Fellowship Foundation Institute on High School Mathematics, the General Electric Teacher Award Program, and the Woodrow Wilson Master Teacher Program. Ms. Burrill is active in several local professional mathematics associations.

MRS. IRIS M. CARL
Elementary Mathematics Instructional
Supervisor
Houston Independent School District
Houston, Texas

NCTM, NCSM

Iris Carl is the mathematics instructional supervisor for 18 elementary schools in the Houston Independent School District. She holds leadership positions in the National Council of Teachers of Mathematics and the National Council of Supervisors of Mathematics. She is a member of Phi Delta Kappa.

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*Please refer to the acronym index at the end of this listing for identification of association memberships.

DR. C. HERBERT CLEMENS AMS, MSC
Professor of Mathematics
University of Utah

Herbert Clemens is a research mathematician whose professional activities, in addition to his distinguished mathematical research at the University of Utah, have included assistance to local school districts in mathematics instruction and work in international mathematics education. Recently, he was an invited speaker at the quadrennial International Congress of Mathematicians. He is a member of the Committee on Mathematics of the National Research Council's Board on Mathematical Sciences.

MR. CLYDE L. CORCORAN NCTM, NEA, MAA
Mathematics Teacher
California High School
Whittier, California

Clyde Corcoran holds degrees in mathematics and education, and is a high school mathematics teacher in suburban Whittier, California. He was a 1983 recipient of the Presidential Award for Excellence in Mathematics Teaching. Mr. Corcoran is very active in local and state chapters of national professional mathematics and education associations.

DR. F. JOE CROSSWHITE NCTM, CSSP, CBMS, MAA, AERA
President
National Council of Teachers of Mathematics
Reston, Virginia

Joe Crosswhite has extensive experience in mathematics education, both as a college professor and a leader in mathematics teaching associations. As president of the National Council of Teachers of Mathematics, he has exercised strong leadership during a period when national concern focused on the quality of mathematics instruction in elementary and secondary schools.

MR. RICHARD de AGUERO NCTM
Director of Student Activities
Miami Senior High School
Miami, Florida

Richard de Aguero has taught high school mathematics in the urban Dade County Public School system, and received the South Florida Teacher of the Year Award in 1976. He has been active in the local chapters of several national mathematics teacher associations, was a member of Florida's Committee on Teacher Education, and received the 1985 Mathematics Educator of the Year award from the Florida Council of Teachers of Mathematics.

MR. WILLIAM J. DENNIS, JR.
Senior Research Fellow
Research and Education Foundation
National Federation of Independent Business, Inc.
Washington, District of Columbia

William Dennis has been with the National Federation of Independent Business — the largest association representing small and independent businesses — for the past ten years. Presently, he is serving as Senior Research Fellow for the NFIB's Research and Education Foundation. His involvements with education include membership on the committee known as the "Heckert Panel," which produced the 1984 National Research Council report, High Schools and the Changing Workplace: The Employers' View.

DR. JOHN A. DOSSEY MAA, NCTM, CBMS, CSSP
Professor of Mathematics
Illinois State University

John Dossey has a degree in mathematics education and has provided mathematics instruction to students at the middle school, high school, and university levels. He received the Max Beberman Award for outstanding contributions to mathematics education in Illinois and the James Armstrong Award for outstanding contributions to community college mathematics in Illinois. He is president-elect of the National Council of Teachers of Mathematics.

DR. JAMES T. FEY NCTM, MAA, AERA
Professor of Curriculum & Instruction
and Mathematics
University of Maryland

James Fey holds a degree in mathematics education, and has been deeply involved in mathematics and mathematics education projects at all levels of learning. Dr. Fey is well known in the mathematics community for his understanding of the use of computers in education, particularly in the mathematics curriculum.

DR. ROBERT GLASER
Co-Director, Learning Research &
Development Center
University of Pittsburgh
AAAS, AERA, APA,
NSSE, NCME, SRCD

Robert Glaser is well known for his work in cognitive research and development. He is president of the National Academy of Education and has received many awards for contributions to his field, including the American Educational Research Association's award for Distinguished Research in Education.

MR. ANDREW M. GLEASON
Hollis Professor of Mathematicks and Natural Philosophy
Harvard University
AMS, MAA,
NAS

Andrew Gleason is a distinguished research mathematician, and a member of the National Academy of Sciences. He was president of the American Mathematical Society, and is chairman of the Steering Committee for the Twenty-First International Congress of Mathematicians, which will take place in 1986.

BROTHER NEAL GOLDEN
Chairman, Computer Science Department
Brother Martin High School
New Orleans, Louisiana
NCTM

Neal Golden is a mathematician who teaches mathematics and computer science in an urban New Orleans high school, where he is also chairman of the computer science department. He has written several high school mathematics and computer textbooks. Brother Golden is a member of the Technology Advisory Committee of the National Council of Teachers of Mathematics.

HONORABLE GENE HOFFMAN
State Representative
Illinois House of Representatives
NCSL, ECS

Gene Hoffman is a member of the Illinois General Assembly, where he now serves as Assistant Minority Leader. He is past chairman of the Illinois School Problems Commission and a member of the Illinois Commission on the Improvement of Elementary and Secondary Education, a product of which was the 1985 Illinois education reform law. Dr. Hoffman is past chairman of the Education and Labor Committee of the National Conference of State Legislatures, and now serves as commissioner from Illinois to the Education Commission of the States.

DR. KENNETH M. HOFFMAN
Professor of Mathematics
Massachusetts Institute of Technology
AMS, AAAS, MAA,
SIAM, NCTM, ASA,
ORSA

Kenneth Hoffman is a research mathematician and author of several widely-used textbooks. He served as head of the Mathematics Department at MIT and most recently has worked with mathematics policy at the federal level, particularly in the development of the "David Report," Renewing U.S. Mathematics: Critical Resource for the Future, and as Chairman of the National Science Foundation's Advisory Committee for Science Education.

DR. JOSEPH R. HOFFMANN
Consultant in Mathematics Education
California State Department of Education
NCTM, AERA, NEA,
USMA, ASSM,
NCSM, MAA

Joseph Hoffmann, whose degree is in mathematics education, works at the state level to improve the mathematics education program in close to 8,000 schools in California. He has done extensive work in testing and evaluation, and curriculum research projects, including the math framework for California schools and the California assessment program. Dr. Hoffmann is president of the Association of State Supervisors of Mathematics.

MR. DAVID R. JOHNSON
Chairman, Mathematics Department
Nicolet High School
Glendale, Wisconsin
NCTM, NCSM

David Johnson teaches mathematics in suburban Nicolet High School, where he is also an administrator involved with supervision of mathematics and science personnel and coordination of curriculum, grades 7 - 12. He was a 1983 recipient of the Presidential Award for Excellence in Mathematics Teaching. He is an active member and leader in many national professional mathematics organizations and their local chapters. Mr. Johnson is also a member of Phi Delta Kappa, and president of the National Council of Supervisors of Mathematics.

MRS. ANN P. KAHN PTA, ASCD
President, The National Congress
of Parents and Teachers
Chicago, Illinois

Ann Kahn has been active in education concerns at the local, state, and national levels. As a member of the Fairfax (Virginia) County School Board, she chaired committees on instruction, gifted and talented, and student responsibilities and rights. Mrs. Kahn has served on advisory panels and review committees for the National Institute of Education and the National Science Foundation.

DR. JEREMY KILPATRICK MAA, NCTM, AERA, IGPME, NCME, CB
Professor of Mathematics Education
University of Georgia

Jeremy Kilpatrick is well known for his research in mathematics education. He was the plenary speaker for the Fifth International Congress on Mathematics Education and the Fifth Conference on Psychology of Mathematics Education. Recently, he delivered the John Wilson Memorial Address to the Research Council for Diagnostic and Prescriptive Mathematics. Dr. Kilpatrick is the editor of the Journal for Research in Mathematics Education.

DR. JOAN R. LEITZEL AMS, MAA, AAAS, AWM
Professor of Mathematics and
Associate Provost
The Ohio State University

Joan Leitzel is a professor of mathematics who was recognized with the Ohio State Alumni Award for Distinguished Teaching and the Rosaline Sedgewick Award for Teaching Service in Arts and Sciences. She is a university administrator and active in several national associations, including the Mathematical Association of America and the Association for Women in Mathematics.

MRS. PEGGY C. NEAL NCTM, NEA
Mathematics Teacher
Burney Harris Lyons Middle School
Athens, Georgia

Peggy Neal is a middle school teacher of mathematics in the urban Clarke County School District. Recently, she received the Gladys M. Thomason Award for Excellence in Mathematics in Georgia, was the Athens Woman of the Year in Education, and was state finalist for the Presidential Awards for Excellence in Mathematics Teaching. Mrs. Neal is an officer in both Phi Delta Kappa and Delta Kappa Gamma, and is an active member of national and local mathematics and education associations.

DR. HENRY O. POLLAK MAA, AMS
Assistant Vice President
Mathematical, Communications & Computer
Sciences Research Laboratory
Bell Communications Research

Henry Pollak is an industrial research mathematician who has contributed greatly throughout the years to the efforts of the professional mathematics community to strengthen mathematics education. He has served in many leadership positions, including chairman of the Conference Board of the Mathematical Sciences and chairman of the National Science Foundation's Advisory Committee on Science and Engineering Education.

DR. JACK PRICE NCTM, AAAS, AASA
Superintendent of Schools
Palos Verdes Peninsula Unified
School District
Palos Verdes, California

Jack Price holds degrees in mathematics education, curriculum development, chemistry, and mathematics. He is superintendent of eight elementary, four middle, and four high schools in southern California. Dr. Price is a well-known mathematics textbook author, who has been very active in mathematics education.

DR. ANTHONY RALSTON Professor of Computer Science State University of New York at Buffalo	ACM, AFIPS, MAA, SIAM

Anthony Ralston moved from his doctorate in mathematics to work in industry (Bell Labs, American Cyanamid), and then to the academic world. His career encompasses teaching, research in programming languages and in computer science education, and administration. He has been president of both the Association for Computing Machinery and the American Federation of Information Processing Societies, and has served on the Computer Science and Technology Board of the National Research Council.

DR. STEPHEN B. RODI Division Chairperson Mathematics & Physical Sciences Austin Community College	AMATYC, MAA, CBMS, COMAP, NCTM

Stephen Rodi is a mathematics professor and administrator, and is a leader in national efforts to enhance mathematics instruction in community colleges. He was the Piper Nominee for the Outstanding Teacher in Texas. Dr. Rodi is president of the American Mathematical Association of Two Year Colleges.

MR. FREDERICK A. ROESCH
Senior Vice President, Global
Electronic Marketing
Citibank, N.A.
New York, New York

Frederick Roesch heads global electronic markets activities for the institutional bank sector of Citicorp. He joined Citibank in 1964 and headed Thailand operations, world-wide venture capital activities, and Citicorp personnel planning and development before assuming his present position in 1985. He was a member of the committee known as the "Heckert Panel," which produced the 1984 National Research Council report, High Schools and the Changing Workplace: The Employers' View.

DR. PAUL J. SALLY Professor of Mathematics The University of Chicago	MAA, AMS

Paul Sally is a research mathematician and professor, who has received the Quantrell Award for Undergraduate Teaching from The University of Chicago. Dr. Sally was chairman of the committee of the Conference Board of the Mathematical Sciences which developed the initial proposal for the Mathematical Sciences Education Board. He is also Director of The University of Chicago's School Mathematics Project, funded by AMOCO.

DR. C. THOMAS SCIANCE Director, Engineering Research E. I. du Pont de Nemours & Co. Wilmington, Delaware	ACS, AICE

Thomas Sciance is a chemical engineer who manages the activities of both the Engineering Technology Laboratory and the Engineering Physics Laboratory at du Pont's Experimental Station in Wilmington. He is a member of the advisory boards for the engineering schools at Duke and Rice Universities, and the advisory committees on chemical engineering at the University of Oklahoma and Texas A&M. Recently, he has served on an industrial committee at the University of Texas, which has just completed a major review of the future of chemical engineering education.

DR. LYNN ARTHUR STEEN Professor of Mathematics St. Olaf College	MAA, CSSP, AAAS, AMS, COMAP, CBMS, JPBM

Lynn Steen is a national leader in undergraduate mathematics education and related policy issues. A prolific and talented writer, Dr. Steen has received on two occasions the Lester R. Ford Award for Expository Writing in mathematics. He is president of the Mathematical Association of America.

DR. DOROTHY S. STRONG Director of Mathematics Chicago Public Schools Chicago, Illinois	NCTM, NCSM, NABSE, ASCD

Dorothy Strong supervises the mathematics program in the 560 schools of the Chicago Public School system. She is a member of Kappa Delta Pi and Kappa Mu Epsilon, and has been awarded the Education Pace Setter Award. Dr. Strong is active in several professional associations, including the Association of Supervision and Curriculum Development.

DR. CALVIN J. WOLFBERG President Pennsylvania School Board Association	NSBA

Calvin Wolfberg is a practicing optometrist in Northumberland, Pennsylvania, where he is also active as president of the Pennsylvania School Board Association. Dr. Wolfberg brings to the Mathematical Sciences Education Board a broad-based understanding of the educational enterprise at the local level.

DR. MORRIS DeGROOT Professor of Statistics Carnegie-Mellon University	AAAS, ASA, IMS, ISI

(Liaison Member, representing the National Research Council's Commission on Behavioral and Social Sciences and Education)

Morris DeGroot is a research statistician who has been active in the National Research Council's Committee on National Statistics, as well as in the NRC Assembly which evolved into the Commission on Behavioral and Social Sciences and Education. He is a fellow of the Royal Statistical Society and now serves on the Advisory Committee for Mathematical Sciences of the National Science Foundation.

DR. HIRSH G. COHEN Vice President, Divisional Operations IBM Research T. J. Watson Research Center Yorktown Heights, New York	SIAM, AMS

(Liaison Member, representing the National Research Council's Commission on Physical Sciences, Mathematics & Resources)

Hirsh Cohen is an industrial mathematician and leader in the national mathematics community. He is past-president of the Society for Industrial and Applied Mathematics, and is a member of the National Research Council's Board on Mathematical Sciences.

ACRONYM INDEX

AAAS	American Association for the Advancement of Science
AAUP	American Association of University Professors
ACM	Association for Computing Machinery
ACS	American Chemical Society
AERA	American Educational Research Association
AFIPS	American Federation of Information Processing Societies
AICE	American Institute of Chemical Engineering
AMATYC	American Mathematical Association of Two Year Colleges
AMS	American Mathematical Society
APA	American Psychological Association
ASA	American Statistical Association
ASCD	Association of Supervision and Curriculum Development
ASL	Association for Symbolic Logic
ASSM	Association of State Supervisors of Mathematics
AWM	Association for Women in Mathematics
CB	The College Board
CBMS	Conference Board of the Mathematical Sciences
CCSSO	Council of Chief State School Officers
CESI	Council for Elementary Science International
COMAP	Consortium for Mathematics and Its Applications
CSSP	Council of Scientific Society Presidents
ECS	Education Commission of the States
IGPME	International Group for the Psychology of Mathematics Education
IMS	Institute of Mathematical Statistics
ISI	International Statistics Institute
JPBM	Joint Policy Board for Mathematics
MAA	Mathematical Association of America
NARST	National Association for Research in Science Teaching
NAS	National Academy of Sciences
NABSE	National Alliance of Black School Educators
NCME	National Council on Measurement in Education
NCSL	National Conference of State Legislatures
NCSM	National Council of Supervisors of Mathematics
NCTM	National Council of Teachers of Mathematics
NSSE	National Society for the Study of Education
NEA	National Education Association
NRC	National Research Council
NSBA	National School Boards Association
ORSA	Operations Research Society of America
SIAM	Society for Industrial and Applied Mathematics
SRCD	Society for Research in Child Development
USMA	United States Metric Association

Appendix II

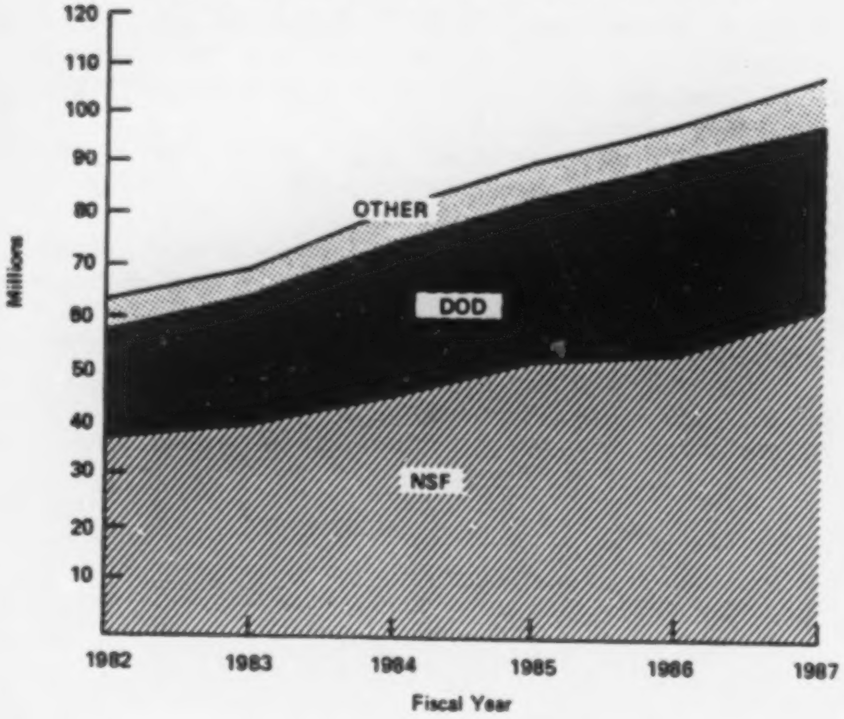
Comparisons of Federal Support in Institutions of Higher Education for Three Fields of Science, 1980

	Chemistry	Physics	Mathematical Sciences
Doctoral scientists in R&D	9,800	9,200	9,100
Faculty with primary or secondary activity in R&D	7,600	6,000	8,400
Faculty in R&D federally-supported	3,300	3,300	2,300
Approximate annual Ph.D. production	1,500	800	800
Graduate research assistants federally-supported	3,700	2,900	200
Postdoctorals federally-supported	2,500	1,200	50

Sources: NRC Survey of Doctoral Recipients,
National Science Board--Status of Science Review

Appendix III

Federal Support of Basic Academic Research in Mathematical Sciences



Federal Support of Basic Academic Research in Mathematical Sciences (FY)

	82	83	84	85	86[3)]	87[4)]
NSF[1)]	34.2	37.1	45.6	52.7	57.2	65.5
DOD[2)] (AFOSR, ARO, ONR, DARPA)	23.3	26.5	29.9	32.3	42.4	39.1
Other[2)] (DOE, NASA, NIH)	4.3	4.8	4.9	5.5	5.9	4.8
Total	61.8	68.4	80.4	90.5	105.5	109.4

1) DMS represents about 90%.

2) This is based on estimates of the mathematics extramural component of some programs.

3) These are pre Gramm-Rudman, SDI and University Research Initiative figures. Their eventual effects may cancel each other.

4) The President's budget. Estimates of ultimate program emphasis (see 2) and future effects of URI and SDI make these tentative, especially outside NSF.

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

STATEMENT OF JOSEPH E. CANALE, COMMISSIONER, CONNECTICUT DEPARTMENT OF HOUSING, ON BEHALF OF THE NATIONAL ASSOCIATION OF HOUSING AND REDEVELOPMENT OFFICIALS

Senator GARN. Next is Mr. Joseph E. Canale. He is the commissioner, Department of Housing, State of Connecticut. He is representing the National Association of Housing and Redevelopment Officials.

Mr. CANALE. Thank you, Mr. Chairman.

Mr. Chairman and members of the subcommittee, I am Joseph Canale, commissioner, the Connecticut Department of Housing and a member of the NAHRO board of governors.

I come before you today when you as Members of the Congress are faced with a difficult task. You are expected to make choices among programs and determine funding levels which will both permit programs to go forward but will not result in the staggering budget deficits we have seen over the past few years. I do not envy you your job.

We feel very strongly that the need, our track record in satisfying the need, and the disproportionate cuts our programs have taken over the last 5 years clearly justify funding at the levels we are requesting.

NEED FOR FEDERAL PARTICIPATION

The 1937 Housing Act was both an admission that State and local governments could not alone solve the housing crisis of this country, and a commitment by the Federal Government to participate in that effort. The magnitude of the problem and the competing forces for local and State dollars still preclude State and local governments from providing sufficient resources to successfully overcome the problem of deteriorated neighborhoods and underhoused and ill-housed people of low income, Mr. Chairman

Now, in fact, Senator, in my own State of Connecticut, the Governor proposed to the legislature that we add an additional $180 million for housing funds for this coming year because of the very shortage that we have in our community and in our State. This is something that is nationwide.

A total of $35 million will be for a pilot program in trying to replace low income housing programs. It is to try to alleviate the long waiting lists that are on the public housing rolls.

Of the regular funding, $56 million is for other programs that we have in our State, for the elderly, moderate rental, the second mortgage down payment assistant program, so forth and so on. We are trying to do our share. I think that most States are in their contributions.

We have assembled some information on communities in the States that members of this subcommittee represent. The information received from your communities is very typical of the information that has been gathered across the country.

An analysis of this information confirms the premise that the Federal Government must continue to participate in partnership with local and

State governments to provide the resources and programs to effectively deal with the problems of housing and community development.

The response of this administration to the Nation's increasing need for these programs has been everything but responsive.

We call upon you, the Congress, to remind the administration of the national commitment which must be maintained to help localities deal with the increasing problems of housing and community development. Just looking at the comparison of total new budget authority for HUD is indicative of this administration's abandonment of this Nation's commitment to our communities.

NEW BUDGET AUTHORITY

New budget authority in 1981 was $33.3 billion. The administration is requesting only $5.5 billion for fiscal year 1987. This represents an 83 percent reduction in funding of these critical programs.

The Congress has not supported the administration in all of its program cuts and program terminations. For this we are grateful.

Now we are particularly appreciative of the efforts of this subcommittee to preserve funding for these critical programs and to reject the direction being charted by the President.

We suggest that the time has come for the Congress to enact measures to increase revenues for deficit reduction rather than placing the burden on the shoulders of the successful HUD programs and the poor.

The administration maintains that the preservation of the existing public housing stock is the highest priority in public housing. Yet, they propose a budget which provides for emergency modernization only. They acknowledge the success of the UDAG program, referring to Assistant Secretary Moran before this committee on April 21, 1986; yet they propose to eliminate the program.

Now they denounce new production programs in the name of preservation of the existing stock, yet they seek to eliminate the rental Rehab Program and the Mod Rehab Program here, Mr. Chairman.

I urge you to pierce the veil of deception and flatly reject the administration's agenda to disengage the Federal Government from these programs.

NAHRO recognizes the need to reduce the deficit, but our overriding concern is the plight of our cities and the poor who live in those cities. Consequently, we strongly urge this committee to appropriate funds for the HUD programs at the fiscal year 1986 post-Gramm-Rudman levels. This level is clearly inadequate to meet the need; however, it is the most we feel we can reasonably ask in view of the current deficit situation, Mr. Chairman.

CDBG PROGRAM

The CDBG program needs no defense. Its success is self-evident.

Two points, however, need to be made concerning this program.

First, HUD data will support the fact that the CDBG program has been increasingly used in a way that the dollars have been targeted more each year to activities serving low- and moderate-income persons. Ninety-three percent of the funds are so targeted.

Second, impact surveys conducted by NAHRO clearly show the dependence of cities on CDBG to support both short and long-term objectives. This program is indispensable, it is an indispensable tool for local governments.

The section 108 Loan Guarantee Program is the one tool available for localities to carry out major development activities which require heavy, up-front infusion of capital. It should be continued.

Despite the growth of other programs, there is still a need for the 312 Loan Program. There are sufficient funds being repaid into the repayment fund to adquately fund this program so that it can continue to provide needed assistance for rehabilitation of our aging stock.

We request that you specifically permit funds which were not obligated in fiscal 1986 to be carried over into fiscal year 1987 for the program in addition, Mr. Chairman, to new repayments into the fund.

The Housing Development Action Grant Program [HODAG] and Rental Rehab Grants Program authorized by the Congress in 1983 are just beginning to show impressive results. NAHRO believes that they should be funded.

We cannot and should not consider a funding level for the operating subsidies other than that which is required by the formula. To suggest a program level which is less than that required will result in the inability of public housing authorities across this country to perform to the level that is then essential for good program administration and to ensure that there is not a deterioration in management or condition of the public housing stock.

NAHRO's recommended funding level of $1.462 billion includes an amount of $100 million to fund the provision of the performance funding system referring to costs beyond control. This provision provides funds for costs over which the PHA has no control but which have exceeded the inflation factors of the performance funding system.

A primary example of this is the cost of insurance coverage for PHA's.

NAHRO further recommends, in reference to costs beyond control, that language be developed for the appropriation act which will direct that funds be used for this purpose.

In prior years appropriations language has, Mr. Chairman, through inadvertence, directed excess funds to be carried over into the next fiscal year, which has precluded HUD, therefore, from utilizing funds to provide payment for costs beyond control.

Modernization of the public housing stock under the CIAP program is a necessity and a high priority for local agencies. We strongly urge the continued support by the Congress of the CIAP program at the fiscal year 1986 level.

PRODUCTION OF NEW PUBLIC HOUSING

Despite the claims of the administration to the contrary, there is a documented need for new production in various areas of the country. It is for this reason that NAHRO supports and requests your support for a minimal level of production of new public housing.

There has been an attempt on your part in the last few years to fund approximately 100,000 new incremental units to the assisted housing inventory.

Now this level was a compromise agreement between the Congress and the administration, which the administration now seeks to break.

We feel very strongly that this number of incremental units is the minimum number to be provided across the country. We strongly urge you to appropriate the necessary funds.

It is also important to have the mix of different types of assisted housing to accommodate the variety of local needs and conditions. We cannot emphasize too much the value of the section 8 existing and moderate rehabilitation programs. These programs have successfully helped us deal with the housing problem in our cities. I also urge this committee to fund these programs at a level with full administrative fees as calculated prior to 1985.

As I stated earlier, NAHRO strongly supports the efforts to reduce the Federal deficit; however, we feel that housing and community development programs have had more than their share of cuts during the last 6 years. We, therefore, strongly support the fiscal year 1986 post-Gramm-Rudman funding levels for the coming fiscal year 1987.

We hope you will exhibit strong individual and group leadership in supporting these funding levels for the programs that you have supported in the past.

Our cities and their low- and moderate-income residents will be appreciative of this effort on your part.

Thank you for the opportunity to present our views, Mr. Chairman.

I will be very happy to answer any questions that you might have.

Senator GARN. Thank you, Mr. Canale, for presenting your statement.

Mr. CANALE. Thank you, Mr. Chairman, for this opportunity today.

[The statement follows:]

STATEMENT OF JOSEPH E. CANALE, COMMISSIONER, CONNECTICUT DEPARTMENT OF HOUSING, ON BEHALF OF THE NATIONAL ASSOCIATION OF HOUSING AND REDEVELOPMENT OFFICIALS

INTRODUCTION

Mr. Chairman and members of the subcommittee, I am Joseph Canale, Commissioner of the Connecticut Department of Housing and a member of the NAHRO Board of Governors. As you know, NAHRO is an association of professionals who administer low-income housing, rehabilitation, and community development programs in localities across the country. Over 5,500 individuals and 2,200 local agencies involved in carrying out these programs belong to our national organization. These members and those active in our regions and state chapters and associations enable us to effectively represent a broader spectrum of those engaged in administering these programs. More importantly, they enable us to speak authoritatively on the range of issues facing communities and agencies, both large and small, during these troubling times.

I come before you today, when you as Members of the Congress are faced with a difficult task. You are expected to make choices among programs and determine funding levels which will both permit programs to go forward but will not result in the staggering budget deficits we have seen over the past few years. I do not envy you your job.

It is my intention today to point out for you the justification for not only continuing these vital housing and development programs but funding them at the FY '86 level. I will do this by focusing on the increasing need for and, equally important, the success at the local level of these programs you have funded in the past. We feel very strongly that the need, our track record in satisfying the need, and the disproportionate cuts our programs have taken over the last five years clearly justify funding at the levels we are requesting. In fact, HUD's housing assistance programs have already been cut to the point that basic capacity to carry out these programs is threatened. Attachment 1 to this testimony compares HUD cuts to those of other agencies since 1981.

The 1937 Housing Act was both an admission that state and local governments could not alone solve the housing crisis of this country, and a commitment by the federal government to participate in that effort. As a result, millions of Americans are better housed in more livable communities across the country.

But, the provision of decent housing and the repair and replacement of aging infrastructure and public facilities is a continuing problem which requires a continuing federal commitment. A visit to almost any city in the country today will show signs of physical decay and the need for additional housing. The magnitude of the problem and the competing forces for local and state dollars preclude state and local governments from providing sufficient resources to successfully overcome the problem of deteriorated neighborhoods and underhoused and ill-housed people of low income. This is true despite the fact that there has been a significant increase in the participation of state and local government in funding and supplementing programs in housing and community development.

In response to the current crisis and the Administration's proposal for FY '87 funding, NAHRO asked its membership to assess the impact of the proposed budget cuts on their localities. This local assessment has been a valuable experience. It has graphically depicted the extent of the problem and the great need for federal programs to assist localities in improving their neighborhoods and providing housing. We have assembled some information on communities in the states that members of this Subcommittee represent (see Attachment 2). The information received from your communities is very typical of the information that has been gathered across the country. An analysis of this information confirms the premise that the federal government must continue to participate in partnership with local and state governments to provide the resources and programs to effectively deal with the problems of housing and community development.

THE ADMINISTRATION'S RESPONSE

The response of this Administration to the Nation's increasing need for these programs has been everything but responsive. The Administration's position is cloaked in rhetoric about the need to reduce the deficit, to reduce government regulation and interference in local matters, and the over-used cliche, "We must all share the burden." Then there is the safety net to protect the interests of deserving poor and needy of this country. Unfortunately, the reality of this Administration's safety net is that the only things which won't fall through are defense systems. We have seen the basic support for the poor and needy of this country and their deteriorated communities fall through the "safety net."

We call upon you, the Congress, to remind the Administration of the national commitment which must be maintained to help localities deal with the increasing problems of housing and community development. We have prepared a chart which shows the program support, or lack thereof, by the federal government since 1981 (see Attachment 3). Just looking at the comparison of total new budget authority for HUD is indicative of this Administration's abandonment of this Nation's commitment to our communities. New budget authority in 1981 was $33.35 billion. The Administration is requesting only $5.535 billion for FY '87. This represents an 83 percent reduction in funding of these critical programs. If these figures were adjusted for inflation, the effect of the reduction would be obviously more extreme.

The proposals in the Administration's FY '87 budget reflect the fact that the President is walking away from the cities and the poor. In terms of the HUD programs, the President is saying to the Congress, "Now is the time to close up the Department of Housing and Urban Development and end the many programs that have so successfully helped millions of people in this country." We urge you to reject these proposals and resume the process of providing some of the necessary resources to support the programs of this federal-local partnership designed to help our cities.

CONGRESSIONAL SUPPORT

The Congress has not supported the Administration in all of its program cuts and program terminations. For this we are grateful. We are particularly appreciative of the efforts of this Subcommittee to preserve funding for these critical programs and to reject the direction being charted by the President. We must acknowledge, however, despite some support, the Congress has yielded to the pressures of the Administration for significant, and in some cases almost fatal, program cuts. In the name of deficit reduction, we have seen the Congress accede to the Administration's request and cut programs. We suggest that the time has come for the Congress to seriously consider enacting measures to increase revenues for deficit reduction rather than placing the burden on the shoulders of the successful HUD programs and the poor.

The Administration has engaged in a massive game of deception. They maintain that they are trying to reduce the deficit, yet, in fiscal 1985, they increased the federal deficit by paying off public housing notes which could and should have been financed over a long period of time.

The Administration maintains that the preservation of the existing public housing stock is the highest priority in public housing, yet they propose a budget which provides for emergency modernization only. They acknowledge the success of the UDAG program (Assistant Secretary Moran before this Committee, April 21, 1986), yet they propose to eliminate the program. They denounce new production programs in the name of preservation of the existing stock, yet they seek to eliminate the Rental Rehab program and the Mod Rehab program. I urge you to pierce the veil of deception and flatly reject the Administration's agenda to disengage the federal government from these programs.

NAHRO RECOMMENDATIONS

NAHRO recognizes the need to reduce the deficit, but our overriding concern is the plight of our cities and the poor who live in those cities. Consequently, we strongly urge this Committee to appropriate funds for the HUD programs at the FY '86 post-Gramm-Rudman levels. This level is clearly inadequate to meet the need; however, it is the most we feel we can reasonably ask in view of the current deficit situation. For comparison purposes, I am attaching a chart which indicates funding levels for FY '87 as requested by the Administration and the NAHRO recommendations. I would now like to highlight the justification for funding these programs at the levels recommended by NAHRO.

Community Development Programs

The CDBG program needs no defense. Its success is self-evident. Two points, however, need to be made concerning this program. First, HUD data will support the fact that the CDBG program has been increasingly used in a way that the dollars have been targeted more each year to activities serving low and moderate income persons; 93 percent of the funds are so targeted. Second, impact surveys conducted by NAHRO clearly show the dependence of cities on CDBG to support both short- and long-term objectives. This program is an indispenable tool for local governments.

The Section 108 Loan Guarantee program is the one tool available for localities to carry out major development activities which require heavy, up-front infusion of capital. The Congress resolved one problem with Section 108 Loans when it mandated private sector participation in the loans to preclude direct federal loans. The Administration's complaint, as indicated in Assistant Secretary Moran's testimony, is that there is a "limited and selective demand for Section 108 assistance." This statement ignores the fact that the program was originally designed to be selectively used, but used to support the basic CDBG. We urge this program be continued.

The Section 312 Rehabilitation Loan program was at one time the primary rehabilitation program utilizing federal assistance. The success of this program served as the basis for a number of successor programs, both federally-assisted and not. Despite the growth of these other programs, there is still a need for the 312 Loan program. The great demand for limited local resources results in the need for a variety of tools to solve the problem of deterioration in our communities. In addition, and most importantly, continuation of this program does not require additional federal dollars. There are sufficient funds being repaid into the Repayment Fund to adequately fund this program so that it can continue to provide needed assistance for rehabilitation of our aging stock. Assuming the Administration's current attempt to defer spending funds for this program in FY '86 is rejected, we request you specifically permit funds which were not obligated in FY '86 to be carried over into FY '87 for the program in addition to new repayments into the fund.

The same Administration that fought so strongly for the Rehabilitation Grants program is now seeking to eliminate it. They cite the availability of "other sources of funding for rental rehabilitation" at the same time they are requesting the elimination of the Section 312 Rehab Loan program and the Moderate Rehab program. Very importantly, the Administration fails to indicate any problems or lack of success with the current Rental Rehabilitation program. The fact is, this new program is working, is successful, and is needed!

The Housing Development Action Grant program (HODAG), authorized by the Congress in 1983, is just beginning to show impressive results. NAHRO believes that it should be funded at least at a modest level of $72 million in order to maintain momentum and program capacity.

Public Housing

Operating subsidies are provided to PHAs to cover the gap between revenues received and the expenses of operating the program. Revenues received consist primarily of tenant rental income which is controlled by statute (i.e., 30 percent of a tenant's adjusted income). We cannot and should not consider a funding level for operating subsidies other than that which is required by the formula. To suggest a program level which is less than that required will result in the inability of public housing authorities across the country to perform to the level that is essential for good program administration and to ensure that there is not a deterioration in management or condition of the public housing stock. NAHRO's recommended funding level of $1.462 billion includes an amount of $100 million to fund the provision of the Performance Funding System referred to as "costs beyond control." This provision provides funds for costs over which the PHA has no control but which have exceeded the inflation factors of the Performance Funding System. A primary example of this is the cost of insurance coverage for PHAs. The additional cost of insurance to PHAs which is not covered by the current Performance Funding System is estimated to be in the $75 to $100 million range. NAHRO further recommends, in reference to "cost beyond control," that language be developed for the Appropriation Act which will direct that funds be used for this purpose. In prior years, appropriations language has directed excess funds to be carried over into the next fiscal year which has precluded HUD from utilizing funds to provide payment for costs beyond control.

The NAHRO estimate also includes an amount of $50 million to cover appeals. This fund would permit public housing authorities to adjust their Performance Funding System base to reflect the reality of operation in the current year. Circumstances and factors might have changed since the base year of the Performance Funding System and as a result dictate that there should be a change to the funding base for the program.

Modernization of the public housing stock under the CIAP program is a necessity and a high priority for local agencies. We strongly urge the continued support by the Congress of the CIAP program at the FY '86 level. A higher level is needed to successfully modernize all of the public housing units, but, as we have stated before, we acknowledge the difficulty of increasing funding during this period of high budget deficits. I am sure all of you have heard the pleas of constituents for modernization funding. I can only reinforce that plea and say that it is a nationwide and universal plea for help to solve the problem of the deteriorating stock of public housing.

Despite the claims of the Administration to the contrary, there is a documented need for new production in various areas of the country. I acknowledge that the vacancy rate is such in some few communities that new production is not required. This, however, must not overshadow the need in other areas. It is for this reason that NAHRO supports and requests your support for a minimal level of production of new public housing. This new housing production component is necessary to replace public housing removed from the stock as well as to provide units in tight housing market areas where the supply of available low- and moderate-income housing is almost non-existent.

Other Housing Programs

There has been an attempt on your part in the last few years to fund approximately 100,000 new incremental units to the assisted housing inventory. This level was a compromise agreement between the Congress and Administration, which the Administration now seeks to break. We feel very strongly that this number of incremental units is the minimum number to be provided across the country. We strongly urge you to appropriate the necessary funds. It is also important to have the mix of different types of assisted housing to accommodate the variety of local needs and conditions. We cannot emphasize too much the value of the Section 8 Existing and Moderate Rehabilitation programs. These programs have successfully helped us deal with the housing problem in our cities. I also urge this Committee to fund these programs at a level with full Administrative Fees as calculated prior to 1985. Attachment #4 indicates the breakdown of incremental units included in the NAHRO recommendation.

Our purpose has been to highlight for a few of the programs the justification for the funding levels recommended by NAHRO. The fact that some of the recommendations have not been covered in this narrative should not be interpreted as a sign of our lack of support. We strongly urge funding of all of the programs at the levels indicated on our attachment.

CONCLUSION

I have attempted in this testimony to articulate the justification for the NAHRO recommendations for funding for the HUD programs during FY '87. As I stated earlier, NAHRO strongly supports the efforts to reduce the federal deficit; however, we feel that housing and community development programs have had more than their share of cuts during the last six years. We therefore strongly support the FY '86 post-Gramm-Rudman funding levels for the coming fiscal year, 1987. We hope you will exhibit strong individual and group leadership in supporting these funding levels for the programs that you have supported in the past. Our cities and their low- and moderate-income residents will be appreciative of this effort on your part.

Thank you for the opportunity to present our views. I will be very happy to answer any questions you might have.

Attachment 1

FEDERAL BUDGET: BUDGET AUTHORITY AND OUTLAYS BY SELECTED AGENCIES
FY 1981 - FY 1986 (Est.)
(in millions of dollars)

	Budget Authority		Outlays		Change	
	FY '81	FY '86 (est.)	FY '81	FY '86	Budget Authority	Outlays
Dept. of Agriculture	$ 28.2	$ 56.7	$ 26.0	$ 54.2	+101%	+108%
Dept. of HUD	33.4	10.7	14.0	15.2	-68	+9
Dept. of HHS*	41.0	58.9	41.3	59.4	+44	+44
Dept. of Interior	6.4	4.3	6.8	4.6	-33	-32
Dept. of Justice	2.5	3.8	2.8	3.8	+52	+36
Dept. of Labor	29.5	27.2	30.1	23.1	-8	-24
Dept. of Transportation	23.7	26.8	22.5	26.3	+13	+17
Dept. of Treasury **	92.7	184.0	93.4	184.7	+98	+97
Dept. of State	2.3	4.1	2.0	2.9	+78	+45
Dept. of Defense - Military	178.4	278.4	156.1	258.4	+56	+66

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*Health and Human Services excluding Social Security and Trust Funds.
**National debt.

SOURCE: Budgets of the U.S. Government FY 1983 and FY 1987.

Attachment 2

NATIONAL ASSOCIATION OF HOUSING AND REDEVELOPMENT OFFICIALS

Housing, Community Development, and Employment Need*

Page 1

State	Community	Persons on Public Hsg. Waiting List	Persons on Section 8 Waiting List	Public Housing Modernization		Homeless Persons	Overcrowded Hsg. Units	Sub-standard Hsg. Units	Un-Employme Rate
				Units	Cost				
CONNECTICUT	Hartford	3,843	1,200	(all)	$64.9M	200-400	3,977	5,200	6.3%
	Stamford	1,382	450	2,000	$10M	800	1,812	2,233	N/A
LOUSIANA	Houma	317	N/A	250	N/A	1,680	338	311	7.5%
	New Orleans	5,500	230	10,891	$390-900M	2,000	N/A	N/A	10.4
	Shreveport	700	1,698	184	$3.6M	N/A	N/A	15,399	13.0%
	Slidell	105	120	30	N/A	100	380	375	10.1%
MISSISSIPPI	Holly Springs	350	100	50.	$75,000	25	100	300	16.9%
NEVADA	Carson City**	N/A	N/A	N/A	N/A	N/A	N/A	N/A	9.5%
	Las Vegas	355	283	300	$1.25M	1,000-6,000	N/A	11,208	7.9%
	Reno	1,630	1,027	450	$4.63M	30,000***	2,762	1,188	6.3%

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* The source of this information is NAHRO's Housing and Community Development Impact Survey.

** Data from Nevada Rural Housing Authority.

*** Served annually in sheltered facilities.

N/A = Not available.

NATIONAL ASSOCIATION OF HOUSING AND REDEVELOPMENT OFFICIALS

Housing, Community Development, and Employment Need*

Page 2

State	Community	Persons on Public Hsg. Waiting List	Persons on Section 8 Waiting List	Public Housing Modernization Units	Public Housing Modernization Cost	Homeless Persons	Overcrowded Hsg. Units	Sub-standard Hsg. Units	Un-Employment Rate
NEW JERSEY	Bridgeton	500	200	300	$1M	100	N/A	250	10%
	Englewood	250	400	154	$130,000	100	N/A	N/A	9%
	Lakewood	150	700	268	$2.5M	100-200	N/A	N/A	N/A
	Madison	500	3	0	$0	N/A	3	6	N/A
	Middletown	350	112	100	$85,000	12	86	24	3.5%
	New Brunswick	200	150	175	$8M	75	4,800	1,700	7.4%
	Paterson	N/A	2,500	N/A	N/A	1,000	N/A	6,430	12.5%
NEW MEXICO	Truth or Consequences	50	25	N/A	$395,000	N/A	N/A	200	N/A

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* The source of this information is NAHRO's Housing and Community Development Impact Survey.

N/A = Not available.

NATIONAL ASSOCIATION OF HOUSING AND REDEVELOPMENT OFFICIALS

Housing, Community Development, and Employment Need*

	Community	Persons on Public Hsg. Waiting List	Persons on Section 8 Waiting List	Public Housing Modernization Units	Public Housing Modernization Cost	Homeless Persons	Overcrowded Hsg. Units	Sub-standard Hsg. Units	Un-Employment Rate
NEW YORK	Buffalo	N/A	1,154**	3,300	$6.5M	N/A	2,902	78,154	N/A
	North Hempstead	500	250-300**	390	$1.5M	100	500	250	3.5%
	Syracuse	1,622	127	2,500	$20M	350	1,529	23.716	8.3%
SOUTH DAKOTA	Flandreau	12	N/A	20	$200,000	50	30	15	4.6%
	Madison	0	N/A	N/A	N/A	0	0	0	6.6%
	Sioux Falls	N/A	800	N/A	N/A	50	17% total	2,333	5.4%
	Volga	0	N/A	N/A	N/A	0	0	0	6.5%
UTAH	Ogden	600	600	199	$80,000	N/A	N/A	N/A	N/A
	Salt Lake County	1,241	1,491	50	$125,000	N/A	N/A	N/A	N/A
	Utah County	188	1,620	20	$50,00	N/A	300	200	6,5%
	West Valley City	N/A	150	N/A	N/A	N/A	N/A	N/A	6.0%

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* The source of this information is NAHRO's Housing and Community Development Impact Survey.
** Exclusive of City of Madison.

N/A = Not available.

NATIONAL ASSOCIATION OF HOUSING AND REDEVELOPMENT OFFICIALS

Housing, Community Development, and Employment Need*

Page 4

State	Community	Persons on Public Hsg. Waiting List	Persons on Section 8 Waiting List	Public Housing Modernization Units	Public Housing Modernization Cost	Homeless Persons	Overcrowded Hsg. Units	Sub-standard Hsg. Units	Un-Employment Rate
VERMONT	Montpelier	30	111	0	$0	5	N/A	606	5.0%
WISCONSIN	Dore County**	-- 1,650 --		N/A	N/A	300	N/A	1,515	5.1%
	Madison	713	383	652	$2.5M	200-400	1,268	1,736	4.4%
	Milwaukee	4,270	10,000	4,668	$64M	450-500	N/A	2,300	7.9%

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* The source of this infomration is NAHRO's Housing and Community Development Impact Survey.

** Exclusive of City of Madison.

N/A - Not available.

NATIONAL ASSOCIATION OF HOUSING AND REDEVELOPMENT OFFICIALS

IF THE ADMINISTRATION'S PROPOSALS ARE ADOPTED, THE COMMUNITY WILL...

Page 1

State	City	Raise Taxes	Cut Housing and CD Services	Cut Police, Fire, Water and Sewer Services
CONNECTICUT	Hartford	Yes	Yes	Yes
	Stamford	Yes	No	No
LOUISIANA	Houma	No	Yes	Yes
	New Orleans	Yes	Yes	Yes
	Shreveport	Yes	Yes	Yes
	Slidell	Yes	N/A	N/A
MISSISSIPPI	Holly Springs	No	Yes	Yes
NEVADA	Carson City	N/A	Yes	Yes
	Las Vegas	No	Yes	No
	Reno	No	Yes	Yes

NATIONAL ASSOCIATION OF HOUSING AND REDEVELOPMENT OFFICIALS

IF THE ADMINISTRATION'S PROPOSALS ARE ADOPTED, THE COMMUNITY WILL...

State	City	Raise Taxes	Cut Housing and CD Services	Cut Police, Fire, Water and Sewer Services
NEW JERSEY	Bridgeton	Yes	Yes	Yes
	Englewood	No	Yes	No
	Lakewood	Yes	Yes	Yes
	Madison	Yes	Yes	No
	Middletown	Yes	No	No
	New Brunswick	Yes	Yes	No
	Paterson	N/A	N/A	No
NEW YORK	Buffalo	Yes	N/A	N/A
	North Hempstead	No	Yes	No
	Syracuse	No	Yes	No
NEW MEXICO	Truth or Consequences	Yes	No	No

NATIONAL ASSOCIATION OF HOUSING AND REDEVELOPMENT OFFICIALS

IF THE ADMINISTRATION'S PROPOSALS ARE ADOPTED, THE COMMUNITY WILL...

State	City	Raise Taxes	Cut Housing and CD Services	Cut Police, Fire, Water and Sewer Services
SOUTH DAKOTA	Flandreau	No	Yes	Yes
	Madison	Yes	Yes	Yes
	Sioux Falls	Yes	Yes	No
	Volga	No	Yes	No
UTAH	Ogden	N/A	N/A	N/A
	Salt Lake County	No	Yes	No
	Utah County	No	Yes	No
	West Valley City	No	Yes	No
VERMONT	Montpelier	Yes	Yes	No
WISCONSIN	Dore County	Yes	Yes	No
	Madison	Yes	Yes	Yes
	Milwaukee	Yes	N/A	N/A

NATIONAL ASSOCIATION OF HOUSING AND REDEVELOPMENT OFFICIALS

Impact of Administration Budget Proposals

Page 1

State	Community	Section 312, Section 8 Mod Rehab, Rental Rehab: Units Not Rehabbed	CDBG Low/Mod Housing Units Not Rehabbed	CDBG Low/Mod Income Jobs Lost	CDBG Persons Losing Services	CDBG Private Investment Lost
CONNECTICUT	Hartford	N/A	90	12	1,950	N/A
	Stamford	N/A	14	3	N/A	$400,000
LOUSIANA						
	Houma	N/A	210	N/A	914	N/A
	New Orleans	N/A	N/A	N/A	N/A	N/A
	Shreveport	394	100	33	0	$1M
	Slidell	N/A	100	N/A	N/A	N/A
MISSISSIPPI	Holly Springs	25	150	100	25	$200,000

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* The source of this information is NAHRO's Housing and Community Development Impact Survey.

N/A = Not available.

NATIONAL ASSOCIATION OF HOUSING AND REDEVELOPMENT OFFICIALS

Impact of Administration Budget Proposals

Page 2

State		Section 312, Section 8 Mod Rehab, Rental Rehab: Units Not Rehabbed	CDBG Low/Mod Housing Units Not Rehabbed	Low/Mod Income Jobs Lost	Persons Losing Services	Private Investment Lost
NEVADA	Carson City	N/A	N/A	N/A	N/A	N/A
	Las Vegas	79	N/A	N/A	N/A	N/A
	Reno	35	450	N/A	200	$75,000
NEW JERSEY	Bridgeton	N/A	N/A	N/A	N/A	N/A
	Englewood	N/A	50	25-50	N/A	N/A
	Lakewood	N/A	25-50	N/A	N/A	N/A
	Madison	0	0	0	N/A	N/A
	Middletown	24	24	36	12	N/A
	New Brunswick	10	24	5	1,200	N/A
	Paterson	84	50	N/A	N/A	N/A

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[*] The source of information is the 1986 NAHRO Housing and Community Development Impact Survey.

N/A = Not available.

NATIONAL ASSOCIATION OF HOUSING AND REDEVELOPMENT OFFICIALS

Impact of Administration Budget Proposals

Page 3

State	Community	Section 312, Section 8 Mod Rahab, Rental Rehab: Units Not Rehabbed	CDBG			
			Low/Mod Housing Units Not Rehabbed	Low/Mod Income Jobs Lost	Persons Losing Services	Private Investment Lost
NEW MEXICO	Truth or Consequences	N/A	N/A	N/A	N/A	N/A
NEW YORK	Buffalo	N/A	361	70	441	$10.7M
	North Hempstead	N/A	50	25	8	N/A
	Syracuse	80	40	10	0	$100,000
SOUTH DAKOTA	Flandreau	N/A	10	7	730	N/A
	Madison	N/A	N/A	N/A	N/A	N/A
	Sioux Falls	100	0	N/A	N/A	N/A
	Volga	6	0	0	0	0

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* The source of information is the 1986 NAHRO Housing and Community Development Impact Survey.

N/A = Not available.

NATIONAL ASSOCIATION OF HOUSING AND REDEVELOPMENT OFFICIALS

Impact of Administration Budget Proposals

Page 4

State	Community	Section 312, Section 8 Mod Rehab, Rental Rehab: Units Not Rehabbed	CDBC Low/Mod Housing Units Not Rehabbed	CDBC Low/Mod Income Jobs Lost	CDBC Persons Losing Services	CDBC Private Investment L
UTAH	Ogden	N/A	N/A	N/A	N/A	N/A
	Salt Lake County	155	100	23	N/A	N/A
	Utah County	80	N/A	N/A	N/A	N/A
	West Valley City	40	85-100	6	3	N/A
VERMONT	Montpelier	15	15	10	N/A	$390,000
WISCONSIN	Dore County**	250-400	N/A	N/A	N/A	N/A
	Madison	150	50	55	1,000	$1.1M
	Milwaukee	400	200	N/A	N/A	N/A

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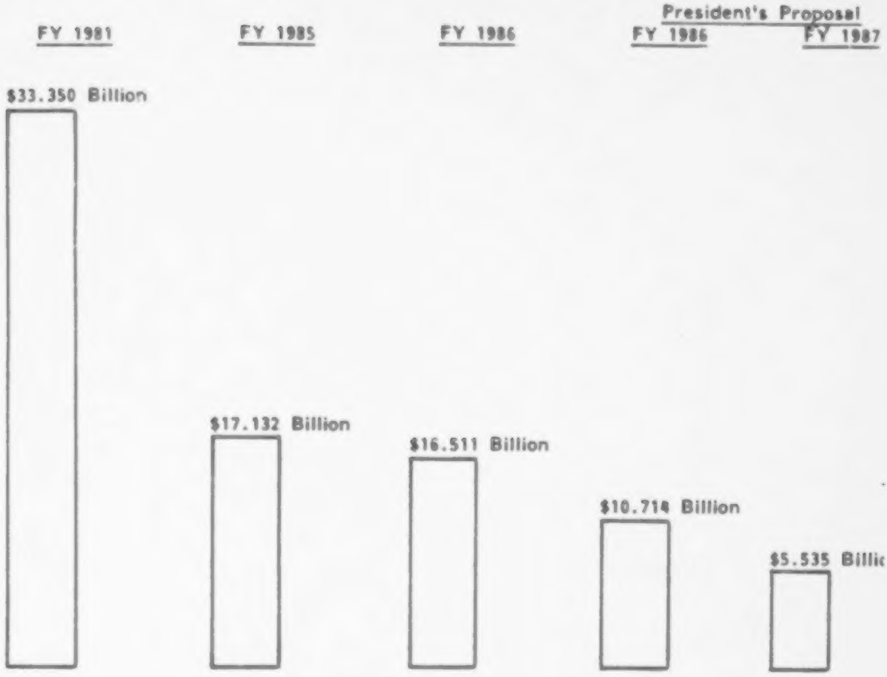
* The source of information is the 1986 NAHRO Housing and Community Development Impact Survey.
** Excluding the city of Madison.

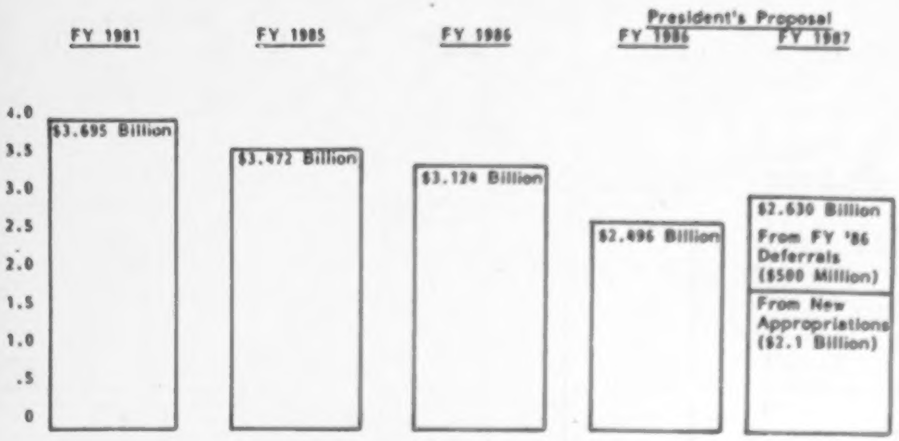
N/A = Not available.

Attachment 3

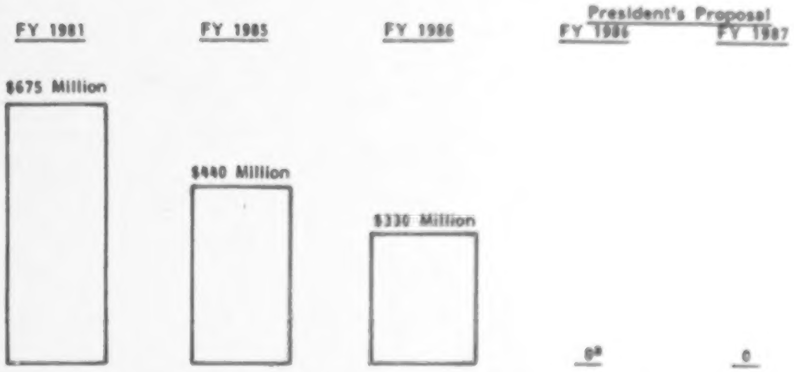
THE FEDERAL COMMITMENT TO HOUSING AND URBAN DEVELOPMENT



New Budget Authority, U.S. Department of Housing and Urban Development.

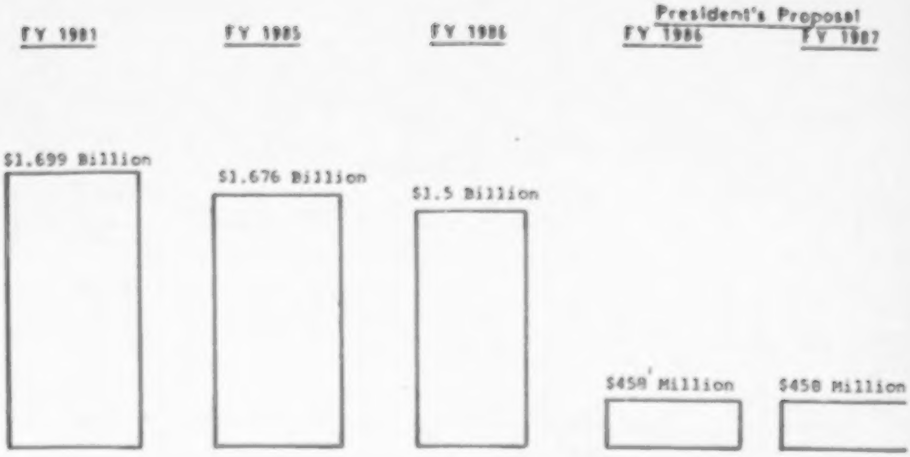


COMMUNITY DEVELOPMENT BLOCK GRANT FUNDS



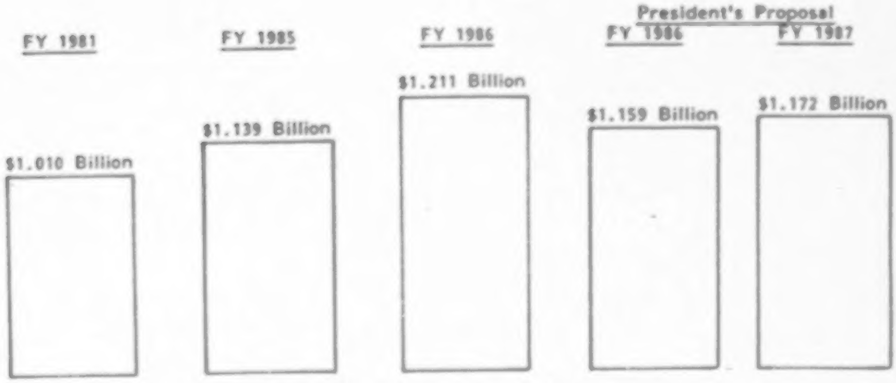
[a] Except for grants already announced before budget message on February 5.

URBAN DEVELOPMENT ACTION GRANT PROGRAM



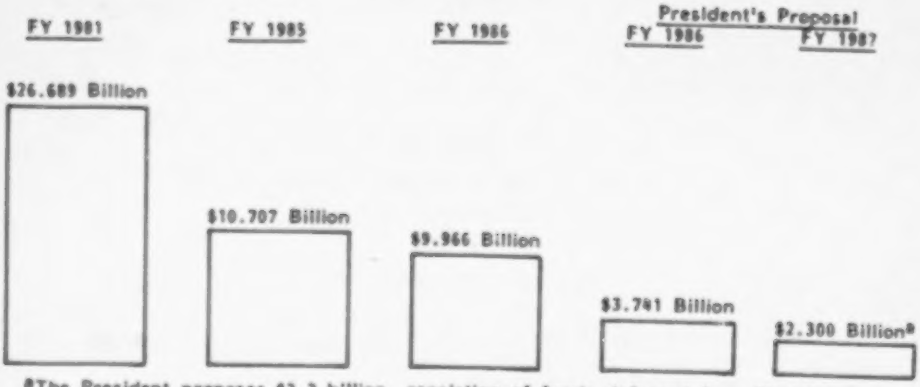
* (1987 numbers are adjusted for changes in the method of financing modernization; actual appropriation is $225 million for direct grants, equivalent to $458 million in long-term debt amortization.)

PUBLIC HOUSING MODERNIZATION FUNDS



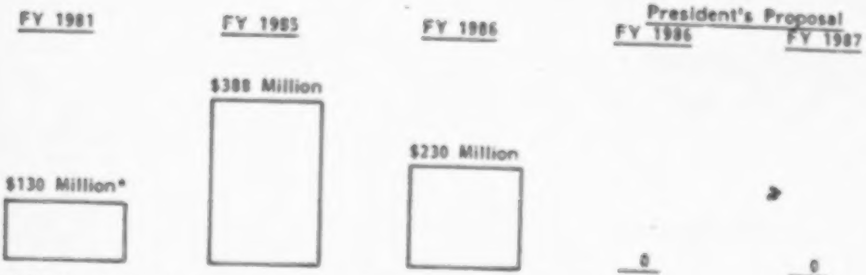
(Numbers exclude carryover funds from prior years.)

PUBLIC HOUSING OPERATING ASSISTANCE



*The President proposes $2.3 billion, consisting of funds deferred from FY 1986, to fund 50,000 vouchers. No new appropriations are requested for FY 1987.

ASSISTED HOUSING PROGRAMS



*Section 312 only; Rental Rehabilitation and HODAC were created in 1984.

REHABILITATION PROGRAMS AND THE HOUSING DEVELOPMENT GRANT PROGRAM (HODAG)

Attachment 4

NAHRO Recommendations

PROPOSED USE OF BUDGET AUTHORITY
FOR HUD PROGRAMS
FY 1987
(dollars in millions)

	Administration Budget	NAHRO
Community Development		
CDBG	$ 2,630*	$ 2,990
Section 108 Loans	0	215
UDAG	0	316
Urban Homesteading	12	11
Section 312	0	130 **
Rental Rehab Grants	0	72
Public Housing		
Operating Subsidies	$ 1,233	$ 1,462
Modernization (CIAP)	225	1,400
New Production:		
Conventional (Units)	0	4,803
Indian (Units)	0	1,921
Assisted Housing		
New Incremental Units:		
Section 202	0	11,528
Section 8 Existing	0	31,203
Section 8 Mod. Rehab	0	9,660
Housing Vouchers	50,000	35,449
Other HUD Programs		
HODAG	0	$ 72
Section 202 Loan Fund	$ 30	549
Congregate Housing Services	0	2.6
Housing Counseling	0	3.3
Fair Housing and Equal Opportunity	5	6.3
Policy, Development and Research	18.9	16.2

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*Includes $500 million proposed to be deferred from FY 1986.

**Whatever amount is available in Repayment Fund. No new appropriation required.

NATIONAL SCIENCE FOUNDATION

STATEMENT OF ELLIOT S. PIERCE, COUNCIL FOR CHEMICAL RESEARCH

INTRODUCTORY REMARKS

Senator GARN. Next we will hear from Dr. Elliot S. Pierce, Council for Chemical Research.

Dr. PIERCE. Thank you, Mr. Chairman.

I have enormous sympathy for the size of the task before you.

The Council for Chemical Research has a very simple recommendation to make to you. I think that well within the allotted time that I can make a case for that.

I am Elliot Pierce, a retired chemist. I am priviliged to bring to this commiteee the views of the Council for Chemical Research.

We are confident that the National Research Council's Board on Chemical Sciences and Technology fully endorses our statement.

The Council for Chemical Research, however, and we will call it CCR, this is an association of 148 leading universities and 47 major companies formed to strengthen the academic and industrial base for U.S. technological competitiveness and the domestic economy.

Our membership includes virtually every research university in the U.S. and the companies that perform 75 percent of the industrial research in chemistry and in chemical engineering.

The chemical industry in the United States supports about a million jobs and ships annually about $175 billion in products and contributes about $10 billion net to our international balance of trade.

Now to maintain this competitiveness requires constant improvement in processes and introduction of new ones, Mr. Chairman.

U.S. universities are, of course, the main source of the basic research on which American industry depends for its knowledge base. They are the main wellspring of our highly trained and imaginative young scientists and engineers.

Chemcial companies have traditionally provided substantial financial support to universities.

Since 1981 they have tripled their contributions to the chemistry and to the chemical engineering departments, largely through the efforts of the CCR.

Some 70 percent of the chemists in this country are employed in industry. That is much the highest proportion of any science. Only the engineers in the technical world, only engineers exceed that.

A science that is so heavily represented in industry will demonstrate a strong correlation between academic research and industrial progress.

Industry is not in a position to carry more than a fraction of the nurturing of U.S. competitiveness through the universities. It is absolutely necessary that the Federal agency responsible for the continued health of our basic scientific enterprise, the National Science Foundation, be given the wherewithal to do its job. This committee has also done its part very well in helping it do its job.

NATIONAL RESEARCH COUNCIL REPORT

The National Research Council has issued a report entitled, "Opportunities in Chemistry." If you don't have a copy here I will be happy to leave it with you. It is known as the Pimental report. This is after its very able chairman.

To produce this report hundreds of leading chemists had analyzed their science, the state of it, and where it could then go.

The report's main observations about today's basic research, basic chemical research, are these three.

They are intellectually exciting, economically promising, and underfunded.

Chemistry is a central science underlying the discovery of new processes and materials, energy, feeding the people, improving health and protecting the environment; also maintaining economic competitiveness and increasing the national security.

There is this other characteristic of chemistry: It is an intellectual challenge and it is exciting.

For example, the research into the complicated molecular system like DNA, the molecule that carries the genetic code.

The report recommends that the NSF support for chemistry should be increased by 25 percent per year for fiscal years 1987, 1988, and 1989 for the reasons that are appearing in these reports. They credit that for reaching that conclusion. It is in the neighborhood of $25 million a year for 3 years, which is miniscule when this is compared to the proven return to our economy from our investment in chemical knowledge.

We are pleased that the NSF Director, in spite of the necessary constraints on all of us, recommends a 17.5-percent increase in the Chemistry Division's budget. At the very least, we feel that must be protected.

Nevertheless, in view of what chemistry has done and can do for the country in terms of economics, contributing to the deficit reduction, we have to state our believe that the increases over and above the President's budget that are recommended by this Pimental survey are fully justified here, Mr. Chairman.

We want to now thank you for the opportunity to present our views for your consideration.

Senator GARN. Thank you, Dr. Pierce for presenting your testimony.

Dr. PIERCE. Thank you, Senator Garn, again, for this opportunity.

Senator GARN. Thank you. We do appreciate your coming today.

[The statement follows:]

STATEMENT OF DR. ELLIOT S. PIERCE FOR THE COUNCIL FOR CHEMICAL RESEARCH

Mr. Chairman and Members of the Committee:

I am Elliot Pierce, a chemist recently retired from the Department of Energy, whose career took place in academia, industry, and government. It is a privilege to testify to this distinguished Committee and to bring you the views of the Council for Chemical Research on the important matter of the budget request for the National Science Foundation, in particular the budget of its Chemistry Division. In addition, we are confident that the National Research Council's Board on Chemical Sciences and Technology endorses fully the statements to be made here.

The Council for Chemical Research (CCR) is an organization of 148 leading universities and 47 major companies. This rather unusual association was formed to strengthen the academic and industrial base for U.S. technological competitiveness and the domestic economy. Our purpose is focused on strong interactions between academia and industry and on support for basic research in chemistry and chemical engineering. Our membership includes virtually every research university in the U.S., and companies that do 75% of this nation's industrial research in these fields.

The chemical industry in the U.S. supports about a million jobs, annually ships about $175 billion in products and currently makes a net contribution to our international trade balance of about $10 billion. Maintaining this competitiveness requires constant improvement of processes and introduction of new ones. Our industry is second to none in its investment in research and development to that end.

Recognizing that U.S. universities are the principal source of the vital basic research upon which American industry depends for its knowledge base, and that they are the principal wellspring of highly trained and imaginative young scientists and engineers, our industry contributes strongly and willingly to their health. Over the last few years chemical companies have tripled their contributions to chemistry and chemical engineering departments, to an annual level of $80 millions.

But industry is not in a position to carry more than a fraction of this vital nurture for continued U.S. competitiveness. It is absolutely necessary that the Federal agency responsible for the continued health of our basic scientific enterprise, the National Science Foundation, be given the wherewithal to do its job.

Chemistry plays a central role in many of our most rapidly developing technological areas. I can illustrate that for biotechnology with an example from du Pont. Their central R&D Department has devoted most of its recruiting in the last 5 years to building up "cutting edge" basic research groups in molecular biology, health sciences and plant science. These groups now contain over 80 Ph.D.'s, but interestingly over half of them have degrees in chemistry.

Since I am a chemist, my support for increased funding for chemistry might seem predictable, but let me back it up with some facts.

Some 70% of the chemists in this country are in industry. This is the highest proportion of any science. Physicists and biologists are at about one-third. Only engineers show a higher fraction. A science so heavily represented in industry will demonstrate a strong correlation between academic research and industrial progress.

I hope that you may have heard of the National Research Council's report with the title, "Opportunities in Chemistry." This report spells out in highly intelligible language the state and the promise of today's chemistry. Hundreds of leading chemists analyzed the state of their art and showed where it could go. The gentleman who managed the task, George Pimentel of the University of California, did an exceptional job of editing and, in addition, maintaining clarity for people not trained in chemistry.

What I would like to do in these few minutes, therefore, is highlight some of the observations of the Pimentel Report, and those of its recommendations which are germane to the program and budget of the National Science Foundation.

The Report's overriding observations about today's chemistry are: intellectually exciting, economically promising, and underfunded.

Professor Harry Gray of the California Institute of Technology, one of the Report's authors and a 1986 winner of the National Medal of Science, set the stage very well when he said:

> "Chemistry is the science of molecules -- how they are made, how they are transformed into valuable new products and materials, and how they can be used safely to improve the quality of life for all humankind.
>
> "Molecules and their transformations are central to almost every aspect of our quality of life, and economic strength, yet there remains much that we do not know about the rules that control the molecular game. You can see this clearly in the search for a cure for AIDS, in the questions surrounding the Shuttle disaster, in the search for environmentally sound approaches to the production and preservation of food, and in the search for improved molecular level switching devices for computers and communication devices.
>
> "As chemists we are both excited and awed by the recent accomplishments and anticipated discoveries on the horizon at a number of chemistry's frontiers. In the report we call particular attention to specific current opportunities. . . These are really not new research areas. What is new is an arsenal of now available tools -- highly sophisticated instruments -- that allow us to explore at the molecular level problems that were previously intractable."

Regardless of which framework we use: science, commerce, or all the needs of society, it is hard to avoid the conclusion that chemistry is a central science. It underlies the discovery of new processes, using new sources of energy, developing new materials, feeding the people of the world, improving health and conquering disease, monitoring and protecting our environment, maintaining our economic competitiveness, and increasing our national security. Chemistry is indeed a crucial element in the nation's well-being.

There is another characteristic of chemistry, however, which has very timely importance. This is its intellectual challenge and excitement. An example of this is research which probes into the details of very complicated molecular mixtures, such as the behavior of DNA -- the molecule that carries the genetic code -- in living processes. That chemists are able to make progress in that complex and amazing jigsaw puzzle is due to their superb intellect and the advanced instrumentation now available. Available, that is, if a professor guiding university research can find the hundreds of thousands of dollars required for some of these modern tools.

So here we see, in modern chemistry, a unique combination of intellectual challenge and economic value, which can help strengthen the economy and bring down deficits if given the required additional investment. The authors of the Report, "Opportunities in Chemistry," accordingly recommended some fractionally significant but absolutely small increases in Federal support for basic research in chemistry. But note this: working within the community of chemists, a very individualistic community, they courageously identified specific areas within chemistry for special attention. In our view this enhances the credibility of the Report and its recommendations. It is not surprising that Dr. Frank Press, President of the National Academy of Sciences, called the Report "a towering achievement."

The Report recommends that the National Science Foundation should begin a 3-year initiative to increase its support for chemistry by 25% per year for FY 1987, FY 1988 and FY 1989. That may sound large at first glance, especially in this time of necessary deficit reduction. In absolute terms, however, they are talking about three increases in the neighborhood of $25 million a year, which is miniscule in comparison to the proven return to our economy from investment in chemical knowledge. The $175 billion of economic activity based on chemical technology sets the scale. And indeed we are pleased that the NSF Director, in spite of current constraints, recommended a 17.5% increase in the Chemistry Division's budget. At the very least, that increase must be protected. Nevertheless we believe that the increases recommended by the Report are fully justified.

The Report also recommends increased funding by industry. The chemical companies that are the industrial side of CCR membership will pay attention to that. They are already doing much, as I mentioned, and intend to continue.

Industry, Government and the academic world each have vital roles to play in the process. Put very simply, the formula is: universities do fundamental research (while providing well trained scientists); Government funds it; industry applies it. It's a very successful formula if each of us does our part properly. Nowhere is the three-legged stool analogy more applicable.

May I close with a quotation from a guest editorial in Science magazine, written by Dr. Edward Jefferson, Chairman of the du Pont Company:

> "All who are concerned that science make its full contribution to national life should study this report and its recommendations. They will be convinced that we need full support of the chemical sciences by government, industry and our academic institutions. Society will be repaid manyfold for such an investment of resources."

Mr. Chairman and Members of the Committee, on behalf of the Council for Chemical Research, I thank you most sincerely for the opportunity to present this testimony to you. We are fully convinced that the Committee has here an opportunity to strengthen the Nation.

FEDERAL EMERGENCY MANAGEMENT AGENCY

STATEMENT OF LACY E. SUITER, CHAIRMAN, LEGISLATIVE COMMITTEE, NATIONAL EMERGENCY MANAGEMENT ASSOCIATION

Senator GARN. Next is Mr. Lacy E. Suiter, chairman, Legislative Committee, National Emergency Management Association.

Mr. SUITER. Good afternoon, sir.

Senator GARN. Please proceed.

Mr. SUITER. I would like to apologize for Mr. Donald A. DeVito of the association who was supposed to be here today to testify. His wife is ill and has had surgery and he could not be here. I will be here representing him and the association today.

Senator GARN. Yes; I understand.

Mr. SUITER. We have submitted the testimony, the written testimony for you. With your permission, I won't go through all of that right now. I will just briefly summarize a couple of statements.

Senator GARN. Yes.

SUMMARY OF STATEMENT

Mr. SUITER. We are pleased to have the opportunity to appear before you again this year, as we did last.

Since the last appearance, the National Emergency Management Association community has had a very high profile in the number of disasters that have occurred.

As you already know, 1985 was marked by a large number of disasters that occurred in the United States. There were 27 Presidentially declared disasters. I think it was something in excess of $375 million in damage assistance that was provided by the Federal Government.

The incident in the Soviet Union in the last couple of days all points to remind us of our vulnerability in this particular area.

There was the Mexico City earthquake, the Colombian volcano explosion, and the chemical accidents in India, and everything else points out that the United States must maintain and must have a joint partnership in this emergency management community that we know about.

These disasters have come at a time when we are now all collectively tightening our belts in an effort to help in the process of reducing the national deficit.

However, there is the possibility that these disasters will continue to occur. While we recognize the need to carefully scrutinize Federal programs in an effort to cut costs and reduce the deficit, we are trying the best that we can; that is, we are trying to minimize the impact this has on the local governments and our local emergency management programs where the service has to be delivered when a tornado occurs and whatever else occurs across the nation.

STUDENT STIPEND PROGRAM

In our testimony we ask you reconsider FEMA's proposal to eliminate the Student Stipend Program at the National Emergency Training Center for the Fire and Emergency Management Institute. We feel that this training is extremely critical. It has probably the biggest impact in terms of improving or of enhancing public safety at the State and local government level here.

The second area of concern that we have, of course, is the recently announced changes that FEMA is proposing in disaster assistance funding or the new cost-sharing proposals. If you take the charts out and look at them—and I was only exposed to this on this past Monday—but no matter how you look at them, we are talking about essentially going to a 50/50 program.

The States and the local governments have already picked up a large share of the disaster recovery program when this occurs.

Now, coupled with the proposed elimination of the Small Business Administration disaster loans, this is really going to be shifting a lot of the money, a lot of the responsibility, of the funding off onto State and the local governments, Mr. Chairman.

We are already picking up a large part of it. Right now we don't know how that is going to work out.

I guess that in a very brief conclusion that we, Mr. Chairman, appreciate what you did for us last year in working in this area.

We think that the States continue to make a lot of progress in the emergency management community and we do hope it will continue to have the flexibility that we had in the years past to reduce property losses and to then reduce the loss of life in the country.

With that, sir, I would be glad to answer any questions you have.

Senator GARN. We thank you for your willingness to testify again.

You did refer to last year.

Mr. SUITER. Yes.

CUT IN CIVIL DEFENSE PROGRAMS

Senator GARN. We are very concerned with FEMA's proposal to cut the civil defense programs from 100 percent to a 50/50 matching and ask for a one-year grace period for States to be able to transition to that. So we did keep you whole for a year.

Mr. SUITER. Yes.

Senator GARN. Now you want us to reinstate the fiscal year 1986 Gramm-Rudman-Hollings automatic reductions in civil defense?

Mr. SUITER. Yes.

Senator GARN. But the question that I do want to ask you is that you have your timetable now indicating how you are transitioning to the 50/50 match?

Mr. SUITER. We are not making as good progress as we would like to make on that. There were several factors that came into play on that right in the process.

A lot of the State legislatures are still meeting. So we don't have the outcome of that. I can give you the approximate outcome in a few minutes.

Senator GARN. Yes.

Mr. SUITER. But it was in the middle of that when FEMA presented its fiscal year 1987 budget and indicated that they were going to request these programs remain 100 percent. That was a complete switch from FEMA's position last year. That probably sent the wrong signal to the Governors and legislatures. I don't know the outcome or have the outcome of that now, but I can tell you about a handfull of States, such as Tennessee, who have indeed appropriated money for that. Kansas is another State that appropriated money to pick that part up, or at least in the new fiscal year. I don't know how many others have or what the impact on that has been since that signal went out at the FEMA headquarters. That was a complete reversal in policy in the program. It caught everybody off guard. We picked up the paper one day and there it is.

The other thing is the General's insistance, or the stated purpose, to return to a pure nuclear attack program in the civil defense area.

Last year in the meetings and discussions we had with the Governors, they had to do with the all-hazard approach for all types of disasters. There was the renewed emphasis on nuclear attack programs which would seem perhaps—and this is not official—this would perhaps be more in the realm of funding responsibilities for the Federal Government on it. We are looking at that. Obviously we did not know about Gramm-Rudman at that point in time. I am not sure that should enter in here at this point in the conversation.

I would say that there are probably more States than I anticipated at this point in time in light of the wrong signal that was sent to FEMA as to appropriating money, but I can't tell you at the moment what it is. I will share that with your staff.

Senator GARN. Thank you.

Mr. SUITER. Yes.

Senator GARN. That is very helpful.

Mr. SUITER. Thank you, Senator.

Senator GARN. Thank you very much.

Mr. SUITER. Thank you for the opportunity to appear with the committee.

[The statement follows:]

STATEMENT OF DONALD A. DEVITO, PRESIDENT, NATIONAL EMERGENCY MANAGEMENT ASSOCIATION

Mr. Chairman, members of the Committee, on behalf of the National Emergency Management Association (NEMA), thank you for the opportunity to present testimony on the Federal Emergency Management Agency (FEMA) FY 1987 budget request.

The National Emergency Management Association is an organization of State Directors of Emergency Management and others from throughout the United States and its territories, who actively promote the principles of Comprehensive Emergency Management (CEM). CEM seeks to improve the interaction of all elements of the public safety community into a cohesive infrastructure for the protection of the public against all hazards, man-made or natural.

From the earliest history of this country, the protection of the public health and safety has been a concern of and a basic function for all levels of government. Numerous acts of our collective legislative bodies attest to this concern. The present system which has evolved to achieve this worthwhile objective, relies upon a partnership among Federal, State and local governments, as well as between the public and private sectors.

Through the Federal Emergency Management Agency, the role of the Federal Government has primarily been one of fiscal support and program guidance to State and local governments. This support has enabled those organizations responsible for public safety to build and to maintain an infrastructure to coordinate the readiness for, response to, and recovery from the multitude of hazards which threaten their respective communities. This infrastructure also provides the administrative mechanism through which FEMA is able to disburse disaster assistance monies pursuant to Public Law 93-288, the Disaster Relief Act of 1974, following a declaration of an emergency or major disaster by the President. This same infrastructure coordinates the delivery of the disaster programs of other Federal agencies and volunteer organizations, such as the Small Business Administration, the United States Department of Agriculture, and the United States Army Corps of Engineers, and the American Red Cross, to name a few.

The FEMA hazard identification process, in which more then 3,000 local governments have participated, has substantiated the fact that no community may be considered safe from any number of hazards which place significant populations at risk.

We have all become too familiar with the human suffering and property damage caused by natural phenomena such as flooding, landslides, hurricanes and earthquakes. The recent experience in several western states, most notably California, Nevada, and Utah, where flooding and landslides forced the evacuation of tens of thousands of people and caused hundreds of millions of dollars in damage, reminds us of just how vulnerable we are.

In Calendar Year 1985 alone, twenty-seven major disasters affecting twenty states were declared by the President for a total of more than $387 million in eligible Federal disaster assistance funds. (See Attachment 1.) While this number is significant in itself, it does not begin to account for total damages, which are in the billions of dollars, nor for the thousands of incidents of a less catastrophic nature, which required a coordinated response by State and local emergency management officials across the nation--a response dependent, in large part, upon the resources provided through those programs labeled "Civil Defense."

In addition to those disasters caused by natural events, government officials and the public are becoming increasingly aware of and concerned about, those hazards which are a result of our growing dependence upon technology. The release of toxic materials into the environment, whether from fixed sites or from transportation-related accidents, is a prime example. Although we cannot reverse these developments, we can, by maintaining an effective emergency management infrastructure throughout the nation, be better prepared to minimize the adverse impact of these and other types of hazards upon the public.

The utilization of "Civil Defense" resources for public safety purposes has proven to be an effective means of achieving the goal of Comprehensive Emergency Management.

As professional Emergency Managers representing State and local governments throughout the nation, we fully recognize the need to reduce the national deficit and realize that to achieve this end, we, as well as others, must endure the difficult transition period ahead as national priorities are redirected. Our national leaders must recognize, however, that to be remiss in providing sufficient funding for efforts to plan, to train, and to maintain the proper infrastructure to deal with emergencies, will cause us to have to pay a significantly higher price in response and in our recovery efforts; not only in dollars, but also in terms of human suffering and lives lost.

It is with this in mind that we address the Administration's proposed "Civil Defense" budget for Fiscal Year 1987.

The portion of the FEMA budget identified as "Civil Defense" is the area of primary concern to State and local governments. It is in this category, where are found the program elements which pass through to States and their localities the Federal share of emergency management funding to support the public safety infrastructure necessary to cope with all hazards, man-made or natural, across these United States.

In an analysis of this budget, it is tempting to relate the agency request for FY 1987, with its application of the provisions of Gramm-Rudman-Hollings legislation, to the FY 1986 estimate, which also incorporates the deficit reduction efforts of that legislation. If that approach is taken, it would appear that the overall reduction for civil defense is only on the order of 3.2 percent.

The impact is more severe. Let me explain.

From our perspective, there are five specific program categories that are particularly critical to State and local efforts in emergency management. They are State and Local Emergency Management; the Radiological Defense Program; the Population Protection planning effort; State and Local Direction Control and Warning; and the program category identified as Training and Education. (See Attachment 2.)

If one makes a comparison of the funding estimates for FY 1986 against the proposal for FY 1987 in those specific areas, it would appear that the overall reduction for State and local program efforts is less than 3 percent. However, in dealing with the impact of this budget on the State and local capacity to deliver effective public safety programs nationally, we must go beyond such a simple temptation and, instead, relate back to the levels of funding for emergency management efforts in fiscal years 1984 and 1985, when the deficit reduction efforts first began. Only then can one fully appreciate just how significant the adverse impact is, has been, and is proposed to be on states and their local governments in this vital area of public safety categorized as "Civil Defense."

Attached is a chart which reflects the actual funding by program for FY 1984 and FY 1985 as well as the level of funding enacted in FY 1986. (See Attachment 3.) It incorporates the FY 1986 estimate based on the application of the provisions of Gramm-Rudman-Hollings, and the FEMA request for FY 1987. The program areas are subdivided into three separate parts; the first deals with those elements which provide direct financial assistance to state and local governments; the second involves those programs that are managed exclusively at the Federal level; and finally, FEMA salary and expenses are separately identified. Taken in total, these constitute "Civil Defense" program funding.

We have endeavored to show both the dollar amounts and the percentile changes between the current budget request and the various levels of funding enacted or experienced prior to deficit reductions, so as to illustrate the magnitude of the decline in resources made available from the Federal government. For example, we make a comparison between the present request and the actual expenditures in FY 1984. By such examination, it becomes obvious that the effect on the states and their localities is significantly greater than the conclusions that could be drawn if one simply analyzed the post Gramm-Rudman-Hollings fiscal effects. While it may be proposed that the change from FY 1986 to FY 1987 is little more than 3.2 percent overall in the civil defense category, by comparing it to the beginning year (FY 1984) when cuts were first applied, note that it is greater than a 24 percent reduction overall. In those program elements of primary concern to States and their localities, the magnitude of the overall reduction from the base year of FY 1984 is also greater than 24 percent.

We do not believe that it is the intention of Congress to apply such significant levels of reduction to those programs of such vital concern to the safety of all of the citizens of the country and which are delivered by the professional emergency managers represented by this Association.

Further, it is unreasonable to expect that States and their localities can afford to correct the deficiencies represented by this overall fiscal plan, particularly in light of the proposed elimination of revenue sharing.

Further, States and their localities are already providing significant levels of support for all manner of public safety programs. In fact, by our estimates, we conclude that they fund some 75 to 85 percent of the resources for emergency management programs, including for those programs identified within the FEMA fiscal system as "Civil Defense."

As we have previously stated, the members of the National Emergency Management Association appreciate the need for deficit reduction and recognize that dramatic action is necessary to correct this grave national problem. However, we argue that the magnitude of change should not be so great as to seriously degrade our capability to provide meaningful public protection programs. We do not believe that the Congress desires that, as we do not believe that this present budgetary proposal carries out the stated intention of Congress to provide an effective meaningful program of civil defense to protect our citizens throughout this nation against all of the hazards which threaten their lives and their property.

All we ask, is that those programs which we have specifically identified as vital to State and local efforts for emergency management be held harmless with respect to any further deficit reduction that is being contemplated by the Congress (i.e., State and Local Emergency Management, Radiological Defense, Population Protection, State and Local Direction, Control and Warning, and Training and Education). To that end, we recommend that approximately $6.4 million be restored to these program elements to raise FY 1987 funding to the FY 1986 enacted level of $91.5 million.

We recognize that restoration of these funds requires an adjustment elsewhere to insure that deficit reductions targets are met. It is NEMA's position that such an adjustment can, and should, be made in other areas of the FEMA budget.

While it is not our place to determine the Agency's priorities, nor do we intend to do so, we note with concern and curiosity that, while the programs which support State and local efforts, are being reduced, FEMA's in-house programs are dramatically increasing. For example, while overall "Civil Defense" funding (post-Gramm-Rudman-Hollings) declines by $4.2 million, the "Federal Preparedness" item is raised by $32.6 million. Similarly, while "Training and Fire Programs" are cut by 46.9%, FEMA "Management and Administration" increases by 9.3%. (See attachment 4.)

State and local government emergency managers across the nation are asking for your assistance in redressing what seems to us to be an inequity in the distribution of the limited resources available for public safety. Realignment of the proposed funding can "hold-harmless" State and lcoal "Civil Defense" efforts, still permit substantial growth in FEMA-specific programs, while achieving the desired deficit reduction level.

By restoring the level of funding in the five programs to $91.5 million, we are proposing, among other things, the reinstatement of the student stipend program for the Emergency Management Institute. It is our contention that absent these monetary incentives, there will be a severe reduction in the number of students that could avail themselves of the vital training and education programs that are delivered by the Institute. It is axiomatic in emergency management that training and education are fundamental to hazard mitigation and that hazard mitigation is less expensive than disaster assistance. Therefore, we believe that the elimination of the student stipend, as proposed in this budget, is not only unsound but is counter-productive to effective emergency management.

During this past year, the nation has been traumatized by a series of major disasters. These disasters have extracted a severe toll in terms of lives lost, human suffering and property damage. The future holds no assurance that the grim realities of the past will not be repeated again in the weeks and months ahead. Thus, it is reasonable and prudent that every level of government do all that it can to insure that the necessary resources are in place to cope with the potential havoc that could be raised by natural phenomena and by those disasters caused by our increasingly complex society and the multitude of man-made hazards attendant thereto.

The concept is fundamental. We, at every governmental level, have a choice in the funding of this emergency management business. We can provide the funds up-front; so that our preparedness efforts, that is the multitude of readiness activities such as public awareness and education, planning, training, and the building of appropriate infrastructures to carry out an effective emergency response are all put in place as part of a hazard mitigation effort. Failing that, the reality is that we will pay significantly greater amounts in disaster relief after the disasters occur--as they surely will! It is a simple matter of pay now or pay later. But pay we will. We, in NEMA, believe that if the Congress provides the necessary funding resources now to assist State and local government efforts, the cost will be significantly less later--not only in terms of dollars, but also in terms of the human suffering involved.

Even with funding levels restored to the FY 1986 enacted levels, we are still faced with a number of issues which will adversely impact upon the delivery of programs for emergency management. Among these are renewed efforts by FEMA to specifically emphasize war-related priorities, more stringent criteria regarding the provision of Federal relief for disaster victims, and a general trend toward inflexibility as regards the administration of State and local government emergency management programs. Our concerns attendant to these issues can be significantly abated if FEMA were to adopt a more meaningful partnership with State and local governments to develop more flexible guidelines for the conduct of all of its programs.

The Federal Emergency Management Agency has implemented a concept called the Integrated Emergency Management System. Basically stated, it is the use of all resources, at every level of government, to deal with all hazards, man-made or natural. It seems to us that the resources available through specific programs identified under the category "Civil Defense" could be granted a more reasonable level of flexibility. In this way, resources could be interchanged between all programs so as to carry out broad national policies, in the context of specific State and local requirements. National preparedness exists only at the grass roots level of local government; in the counties, cities, towns and villages of this nation. The orientation of the States and the Federal government must be directed towards the enhancement of local emergency management capabilities. By providing greater flexibility in the use of Federal resources to deal with those areas of specific concern to States and their localities, we can insure that the integrated emergency management system, as advocated by FEMA, becomes a reality rather than remaining a philosophy.

We, in NEMA, recognize that there must be audit and oversight accountability vested in the Federal Emergency Management Agency with respect to these programs. Those matters and specific work-plan objectives can be resolved within the context of State and local requirements by staff at the various Regional Offices of the Federal Emergency Management Agency. They are best positioned to deal with specific State concerns.

Programs that work in Texas may not have application in Tennessee. Connecticut's needs may not be relevant to California. Thus, we should not blindly adhere to rigid inflexible guidelines with respect to program delivery, but ought to make the relationship between the States and their local governments and FEMA a true partnership dedicated to seeking a more effective way to deliver vital programs of public safety at the local level where they are most needed.

To achieve a more flexible system, one which recognizes the diversity of the several states, the program category "Civil Defense" should be modified to incorporate the principles of the Integrated Emergency Management System. Then, States and their localities, operating under a concept of greater flexibility as regards the application of the limited resources available, could more reasonably tailor their emergency management programs to accommodate their specific concerns, while still meeting those broad guidelines required to fulfill national policies and goals.

Finally, let me reiterate that the members of the National Emergency Management Association are fully cognizant of and appreciate the need for significant reductions in the federal deficit. We make these proposals in the full and certain knowledge that if the Congress fails to provide sufficient resources now to sustain the vital programs for public safety that have been developed over the past several-years, a serious degradation in our capability to protect the people of this country will result. The consequence of that action will be that when disasters occur, as they most surely will, the cost will be significantly greater for our recovery efforts then would have been necessary had we made reasonable expenditures now to insure that every state in the Nation has an appropriate infrastructure to deal with any hazard that might occur, and is able to pursue programs designed to minimize the adverse impact of disasters in the future. We, as members of the vast community of emergency managers throughout the nation, ask your help in assisting us to achieve these vital public safety goals.

ATTACHMENT 1

27 MAJOR DISASTERS DECLARED BY THE PRESIDENT IN 1985

DATE of DECLARATION	STATE	TYPE	Total Federal Disaster Assistance[1]
Jan. 15	Arizona	Heavy Rain & High Winds	$ 976,241.00
n. 18	New Mexico	Severe Storms & Flooding	1,853,435.00
Mar. 18	Florida	Severe Freeze	10,019,250.00
Mar. 20	New York	Flooding	1,337,034.00
Mar. 22	New York	Snow Melt & Ice Jams	872,952.00
Mar. 29	Illinois	Severe Storms & Flooding	3,969,576.00
May 31	Puerto Rico	Storms, Mud/Land Slides, Flooding	20,166,602.00
June 3	Pennsylvania	Severe Storms, High Winds & Tornadoes	7,791,437.00
June 3	Ohio	Severe Storms & Tornadoes	2,985,524.00
July 18	California	Grass, Wildlands & Forest Fires	5,701,075.00
Aug. 7	Wyoming	Severe Storms, Hail & Flooding	3,489,220.00
Sept. 4	Mississippi	Hurricane Elena	24,074,592.00
Sept. 7	Alabama	Hurricane Elena	5,625,693.00
Sept. 12	Florida	Hurricane Elena	8,192,144.00
pt. 18	Michigan	Severe Storms and Flooding	5,537,540.00
Oct. 8	Pennsylvania	Hurricane Gloria	8,102,056.00
Oct. 10	Puerto Rico	Severe Storms, Flooding & Mudslides	51,994,075.00
Oct. 11	Connecticut	Hurricane Gloria	12,007,561.00
Oct. 15	Rhode Island	Hurricane Gloria	4,802,304.00
Oct. 15	New Jersey	Hurricane Gloria	3,019,993.00
Oct. 18	New York	Hurricane Gloria	35,775,424.00
Oct. 28	Massachusetts	Hurricane Gloria	12,865,146.00
Nov. 1	Louisiana	Hurricane Juan	26,630,832.00
Nov. 7	West Virginia	Severe Storms & Flooding	87,381,492.00
Nov. 8	Pennsylvania	Severe Storms & Flooding	7,162,570.00
Nov. 9	Virginia	Severe Storms & Flooding	28,381,206.00
Dec. 3	Florida	Hurricane Kate	6,890,185.00
TOTAL			$387,605,159.00

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[1] Represents assistance of the Federal Emergency Management Agency only. Does not include programs available under the authority of other Federal Departments or Agencies.

ATTACHMENT 2
CIVIL DEFENSE PROGRAMS
ESSENTIAL TO THE PUBLIC SAFETY

State and Local Emergency Management: The foundation of the comprehensive emergency management effort at State and local levels. EMA is a cost-effective program and provides for a trained cadre of full-time emergency management personnel. The loss of any portion would undermine or impede the ability to respond to emergencies. EMA provides the only organizational funds that flow through states to local governments.

Radiological Defense: The increase of radiological uses in the private and public sector and the increase of transporation of low/high level waste generates a requirement for trained and immediately available personnel and equipment to respond to hazardous materials accidents.

Population Protection: Provides for all-hazards planning assistance by the States, for local government, which addresses all emergencies, man-made and natural. Included are evacuation and sheltering plans and emergency public information.

State and Local Direction, Control and Warning: The heart of all emergency management for state and local government; the loss of this program would destroy the ability to warn, control or to manage emergencies and would increase the vulnerability of our nation's citizens to disasters and emergencies.

Training and Education: The only program which allows for the professional development of emergency managers and for awareness efforts to inform other government officials and the general public. Provides continuity and uniformity of response procedures.

ATTACHMENT 1

COMPARATIVE ANALYSIS OF FEDERAL CIVIL DEFENSE FUNDING

1987 BUDGET REQUEST

(DOLLARS IN MILLIONS)

PROGRAM	(1) 1984 Actual	(2) 1985 Actual	(3) 1986 Enacted	(4) 1986 Estimate	(5) 1987 Request	Change Col (4) to (5)	Change Col (3) to (5)	Change Col (2) to (5)	Change Col (1) to (5)
• State & Local Emergency Management	$ 56.8	$ 58.4	$ 57.8	$ 55.3	$ 54.9	$- 0.4 (- 0.7%)	$- 2.9 (- 5.0%)	$- 3.5 (- 6.0%)	$- 1.9 (- 3.4%)
• Radiological Defense	10.3	10.1	9.7	9.3	9.2	$- 0.1 (- 1.1%)	$- 0.5 (- 5.2%)	$- 0.9 (- 8.9%)	$- 1.1 (- 10.7%)
• Population Protection	13.0	12.7	12.0	11.5	11.4	$- 0.1 (- 0.9%)	$- 0.6 (- 5.0%)	$- 1.3 (- 10.2%)	$- 1.6 (- 12.3%)
• State & Local Direction Control & Warning	18.5	12.0	0.6	0.5	0.5	$ 0.0 (0.0%)	$- 0.1 (-17.0%)	$- 11.5 (- 95.8%)	$- 18.0 (- 97.3%)
• Training & Education	14.0	13.9	11.4	10.9	9.1	$- 1.8 (-16.5%)	$- 2.3 (-20.2%)	$- 4.8 (- 34.5%)	$ 4.9 (- 35.0%)
SUB-TOTAL[1]	$112.6	$107.1	$ 91.5	$ 87.5	$ 85.1	$- 2.4 (- 2.7%)	$- 6.4 (- 7.0%)	$- 22.0 (- 20.5%)	$- 27.6 (- 24.5%)
• Protection of Industrial Capability	$ 4.6	$ 1.5	$ 0.0	$ 0.0	$ 0.0	$ 0.0 (0.0%)	$ 0.0 (0.0%)	$- 1.5 (-100.0%)	$ 4.6 (-100.0%)
• Research	5.6	4.1	0.1	0.1	0.1	$ 0.0 (0.0%)	$ 0.0 (0.0%)	$- 4.0 (- 97.6%)	$- 5.5 (- 98.2%)
• Telecommunications & Warning	15.2	33.4	17.4	16.7	13.7	$- 3.0 (-18.0%)	$- 3.7 (-21.3%)	$- 19.7 (- 59.0%)	$- 1.5 (- 9.9%)
• Automatic Data Processing	0.0	0.0	0.0	0.0	0.0	$ 0.0 (0.0%)	$ 0.0 (0.0%)	$ 0.0 (0.0%)	$ 0.0 (0.0%)
SUB-TOTAL	$ 25.4	$ 39.0	$ 17.5	$ 16.8	$ 13.8	$- 3.0 (-18.0%)	$- 3.7 (-21.1%)	$- 25.2 (- 64.6%)	$- 11.1 (- 44.6%)
• FEMA Salaries & Expenses	$ 29.5	$ 27.7	$ 27.7	$ 26.5	$ 27.7	$+ 1.2 (+ 4.5%)	$ 0.0 (0.0%)	$ 0.0 (0.0%)	$- 1.8 (- 6.1%)
(work years)	(661)	(564)	(500)	(500)	(508)	(+8)	(+8)	(-56)	(-153)
SUB-TOTAL	$ 29.5	$ 27.7	$ 27.7	$ 26.5	$ 27.7	$+ 1.2 (+ 4.5%)	$ 0.0 (0.0%)	$ 0.0 (0.0%)	$- 1.8 (0.0%)
TOTAL CIVIL DEFENSE	$167.5	$173.8	$136.7	$130.8	$126.6	$- 4.2 (- 3.2%)	$-10.1 (- 7.4%)	$- 47.2 (- 27.2%)	$- 40.9 (- 24.4%)

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[1] Sub total of Programs which provide direct financial assistance to State and Local Government.

ATTACHMENT 4
COMPARATIVE ANALYSIS OF FEDERAL EMERGENCY MANAGEMENT AGENCY FUNDING
FFY 1984 - FFY 1987
(DOLLARS ROUNDED IN MILLIONS)

	(1) 1984 Actual	(2) 1985 Actual	(3) 1986 Enacted	(4) 1986 Estimate	(5) 1987 Request	Change Col (4) to (5)	Change Col (3) to (5)	Change Col (2) to (5)	Change Col (1) to (5)
* Civil Defense	$167.5	$173.9	$136.7	$130.8	$126.6	$ - 4.2 (- 3.2%)	$ - 10.1 (- 7.4%)	$ - 47.2 (- 27.2%)	$ - 40.9 (- 24.4%)
* Comprehensive Emergency Preparedness Planning	6.9	8.7	9.0	8.6	9.0	$ + 0.4 (+ 4.7%)	$ 0.0 (+ 0.0%)	$ + 0.3 (+ 3.5%)	$ + 2.1 (+ 30.4%)
* Radiological Emergency Preparedness	6.2	6.4	6.5	6.2	6.5	$ + 0.3 (+ 4.8%)	$ 0.0 (+ 0.0%)	$ + 0.1 (+ 1.6%)	$ + 0.3 (+ 4.8%)
* Federal Preparedness	130.8	140.1	152.0	145.4	178.0	$ + 32.6 (+ 22.4%)	$ + 26.0 (+ 17.1%)	$ + 37.9 (+ 27.1%)	$ + 47.2 (+ 36.1%)
* Training and Fire Programs	16.7	24.0	23.4	22.4	11.9	$ - 10.5 (- 46.9%)	$ - 11.5 (- 49.2%)	$ - 12.1 (- 50.4%)	$ - 4.8 (- 28.8%)
* Flood Plain Management	61.7	53.0	51.3	49.1	0.0	$ - 49.1 (-100.0%)	$ - 51.3 (-100.0%)	$ - 53.0 (-100.0%)	$ - 61.7 (-100.0%)
* Disaster Relief Act (salaries & expenses)	6.4	7.0	6.5	6.3	6.6	$ + 0.3 (+ 4.8%)	$ + 0.1 (+ 1.5%)	$ - 0.4 (- 5.7%)	$ + 0.2 (+ 3.1%)
* Insurance Activities (salaries & expenses)	2.7	2.0	2.6	2.5	0.0	$ - 2.5 (100.0%)	$ - 2.6 (100.0%)	$ - 2.0 (-100.0%)	$ - 2.7 (-100.0%)
* Emergency Food & Shelter (salaries & expenses)	0.0	0.1	0.2	0.2	0.0	$ - 0.2 (-100.0%)	$ - 0.2 (-100.0%)	$ - 0.1 (-100.0%)	$ - 0.0 (- 0.0%)
* Management and Administration	31.6	35.4	29.3	28.1	30.7	$ + 2.6 (+ 9.3%)	$ + 1.4 (+ 4.8%)	$ - 4.7 (- 13.3%)	$ - 0.9 (- 2.9%)
Total, FEMA operating Programs & Management & Administration	$430.5	$450.6	$417.5	$399.6	$369.3	$ - 30.3 (- 7.6%)	$ - 48.2 (- 11.6%)	$ - 81.3 (- 18.1%)	$ - 61.2 (- 14.2%)

STATEMENT OF ELLIS M. STANLEY, SR., PRESIDENT, NATIONAL COORDINATING COUNCIL ON EMERGENCY MANAGEMENT

Senator GARN. Next is Mr. Ellis M. Stanley, Sr., the president of the National Coordinating Council on Emergency Management.

Mr. STANLEY. Thank you, Chairman Garn, for the opportunity to be here to testify.

The National Coordinating Council on Emergency Management endorses the testimony of the national emergency managers on money.

I will not read my statement and will ask that it be entered in the record.

Senator GARN. Yes.

Mr. STANLEY. I would like to just make a few statements on some of the concerns we have.

Senator GARN. We will be happy to put your full statement in the record when you are finished.

Mr. STANLEY. Thank you, sir.

TRAINED PERSONNEL ESSENTIAL

Specifically, in order to sustain programs classified as civil defense, we must have trained personnel. When we look at the perspective of the Federal, State, and local governments, we look at an inverted type pyramid.

In a disaster situation we are the ones on the front line. We are the ones that really have to have our things in order to be able to respond and be able to meet firsthand those contingencies that we have to deal with.

We have to have trained people. In this new technological society we have to adapt to the things that we are being faced with on a day-to-day basis, be they chemical or the other things that we have been seeing in the news as of late.

When we, too, found out about the different approach that the administration was taking and the emphasis that the local governments must pay their fair share, we feel that we are, Mr. Chairman.

We are having to utilize in many localities a lot of our volunteers. One of the worst things that you can have in responding is untrained volunteers. We have to train our personnel. We have to train the local emergency managers throughout the local government to be able to train those volunteers to be able to assist when responding to some type of incident at the time.

At the time that we did find out about this particular cutback on the stipends and the moneys, the National Coordinating Council did a national survey of all 10 regions to determine what impact that it would have and what the locals in the field were concerned about on monies.

Throughout we found that many of the governments were very short staffed, small staffed. They had limited budgets to deal with. Many of them, in fact, less then 2 percent of all the ones that we surveyed throughout the Nation, would be able to attend the Emergency Management Institute if, in fact, the stipends were cut. We think in order to provide some central point for training, to establish uniform training, that we must have the stipends put back in place.

Mr. Chairman, I do appreciate the opportunity to make the statement.

Senator GARN. Thank you.

Mr. STANLEY. I would be more than happy to answer any questions.

Senator GARN. Thank you very much, Mr. Stanley.

NATIONAL COORDINATING COUNCIL SURVEY

Last year there were over 7,000 students that attended EMI courses at Emmitsburg, Md. The survey that you have described in your testimony indicated that 2 percent of the respondents indicated they would attend the EMI courses if the travel stipends were not provided.

Mr. STANLEY. Yes.

Senator GARN. How many people were included in your survey?

Mr. STANLEY. In this survey I have information that I will be glad to enter into the record.

Senator GARN. Yes.

Mr. STANLEY. We did telephone canvassing as well as many individuals, having many individuals attend the local and the State association meetings. Of those, I would assume that many had attended before. I am not really assuming. I know that many had attended before. Out of the 10 regions we probably contacted over 300 individual students or individuals on a personal basis, plus the survey, the telephone survey, Mr. Chairman.

Senator GARN. Do you think that the same statistics would apply to the students in National Fire Academy courses, Mr. Stanley?

Mr. STANLEY. I beg your pardon.

Senator GARN. Do you think that the same statistics, relatively speaking, would apply to the National Fire Academy courses as well?

Mr. STANLEY. It probably would. But we can't compare the local budgets of fire departments to the local budgets of others. Although they do have very good ongoing training programs, we did not do the survey. I would not want to hazard a guess.

Senator GARN. What percentage reduction would you estimate there would be in the EMI course students if Congress reinstated 75 percent of the stipend funding but it required that resident students pay for lodging in the dormitory at Emmitsburg?

Mr. STANLEY. There would be some reduction, I'm sure. We could be involved, I guess, in the process of determining what would be fair and equitable to the locals in setting up some type of residence or fee structure. I then believe that we would still have locals attend.

Again, uniformity is something that is needed. That, right now, is the only single place that we have to ensure that we have some type of uniformity.

Thank you, Mr. Chairman.

Senator GARN. Thank you, Mr. Stanley. I appreciate your testimony.

Mr. STANLEY. Yes, sir.

Senator GARN. It's nice to see you again.

Mr. STANLEY. Thank you.

Senator GARN. Your statement will be included in the record.

Mr. STANLEY. Thank you.

[The statement follows:]

STATEMENT OF ELLIS M. STANLEY, SR., PRESIDENT, NATIONAL COORDINATING COUNCIL ON EMERGENCY MANAGEMENT

My name is Ellis M. Stanley, Sr., President of the National Coordinating Council on Emergency Management, and I am a local emergency manager from Durham, North Carolina.

The National Coordinating Council on Emergency Management, established since 1952 and formally known as the U.S. Civil Defense Council, is a nationwide, non-profit, private membership association representing the public interest in the realm of local government emergency preparedness. The membership of National Coordinating Council on Emergency Management, for the most part, consists of local emergency management and civil defense directors whose role is saving the lives and protecting the property of citizens on a daily basis.

Through the years, our association has also come to include within the body of its membership, other professional and technical personnel who work on a daily basis in the broad field of emergency response preparedness and management.

In order to meet the mandate of the Civil Defense Act of 1950 including its amendments of 1980 and 1981, emergency management assistance is essential. The local, state and federal infrastructure is dependent upon federal funding.

In past years, the Congress and this subcommittee, have taken a close look at the Federal Emergency Management Agency's programs. We believe that the proposed significant levels of reduction to the

Federal Emergency Management Agency's programs will adversely effect the safety of all our citizens of the country and will diminish the ability of our nation's professional emergency managers to deliver their services.

Specifically, in order to sustain programs classified as "civil defense", we must have trained personnel. The Federal Emergency Management Agency's fiscal year '87 budget eliminated the stipend program; without it training will be reduced and uniform training will be lost. We must have these funds restored. The Emergency Management Institute is the only institution in the country at which professional emergency managers can receive advanced uniform training and education.

Further, at the present time, those who do receive training go back to their communities and teach additional local volunteers. This pyramid effect allows a cost effective method of training large numbers of personnel. Interruption of this training process will diminish the number of locally trained volunteers.

The administration says localities must pay their fair share of training. We already are. Local government is supporting the local emergency manager. Localities pick up the cost of personnel in their community's office while their emergency manager is at training school. Further, the localities are paying for the salaries of these emergency managers and these are on-going costs to the localities. The Emergency Management Institute is an important and a valuable training source for our nation's emergency managers, but there are limits to local governments' ability to assist in funding.

Local governments are being hard pressed for funds. At a time when the Federal Emergency Management Agency is withdrawing funds for stipends and training, other federal programs are being chipped away and thus placing increased pressure on the financial base of these governments. General revenue sharing is in question and is up for reauthorization this year. Many local governments are at their maximum taxing capability and thus would not be able to raise taxes in order to fund these programs.

The National Coordinating Council on Emergency Management has completed a random sampling of its membership and found that less than 2% of those surveyed would be able to continue attendance at the Emergency Management Institute if the Federal Emergency Management Agency's stipends and travel funds are cut out of the budget.

The Federal Emergency Management Agency's budget monies are very important and there should be no cut in these funds. At a time of increased international tension we ask the question: **Are these cutbacks sending out the right message?** The media has already presented their perception of our weaknesses in recent weeks. Various forms of security and our emergency preparedness are going to come under further scrutiny in future weeks and months. We must fund our programs at a level at which emergency managers can deliver the services established as need. In light of recent events, don't tie the hands of those on one of the front lines -- the local emergency manager.

In summary, we are deeply concerned about these contemplated monetary cutbacks which will adversely effect the utilization of these "civil defense" resources. Their overall effectiveness will be hampered if the opportunities for training are diminished and monies are not available. We urge the subcommittee to take these matters under careful consideration and provide the needed financial support for programs mandated by the Civil Defense Act.

STATEMENT OF RONALD G. DARRAH, PRESIDENT, NATIONAL FIRE INFORMATION COUNCIL

Senator GARN. Next is Mr. Ronald G. Darrah, president, National Fire Information Council.

Mr. DARRAH. Thank you, Chairman Garn, for the opportunity to speak to you today.

My name is Ronald G. Darrah. I am a battalion chief with the San Diego Fire Department and presently assigned to the suppression activities. I am also president of the National Fire Information Council, in which capacity I would like to speak to you today.

Senator GARN. Yes.

Mr. DARRAH. I have submitted written testimony. I would like that entered in the record, if possible, when I finish, sir.

Senator GARN. Yes, certainly.

Mr. DARRAH. Thank you, sir.

NATIONAL FIRE INCIDENT REPORTING SYSTEM

The National Fire Information Council is an organization of States and metro members, 40 States and 25 metro members, that use the national fire incident reporting system.

Now that system was developed by the U.S. Fire Administration a little over 10 years ago, and it was put into place.

Over that 10 years we have had States coming onto the system. Initially, there were approximately 4 States that started; now we are up to 40. As I said, it is up to 25 metro members.

The program is designed to collect fire incident data at the fire scene, which is critical to the data analysis. We have over 11,000 participating fire departments in the system today. The population that is covered by those departments is well over 50 percent of the Nation's population, including the states of Alaska and Hawaii.

The incident system is designed to collect data from the local level, as I said, at the fire scene, by the fire captain. Then that local department, if it is a metro department and uses computers, will enter that data into their computer and do their own local data analysis. If this is a smaller department they will then send that data up to the State level and ask the State to do some analysis for them. Regardless of whether they are a large department or a small department, they all send their local data up to the State level so the State can enter that into the State computer and then do an analysis of the State fire problem.

After that is done, the participating States then send that information to the U.S. Fire Data Center, which is part of the U.S. Fire Administration. That data is then compiled and analyzed to get a picture of what the national fire problem is.

That picture is not a pleasant one. We kill over 6,000 people a year in this country due to fire. That is absolutely the worst record of any industrialized nation in the world today. That does not include the injuries and the time lost from work and business.

The locals and the state members use the data for local and State problems.

COOKING FIRE PROBLEMS

For example, in Orlando, Fla., recently they did a study on some cooking fire problems that they had. They found that about within about three census tracks that a large percentage of their fires were cooking fires. These are fires where actually the people would put the pot on the stove and then go off and do something else and forgot that they had the food on the stove. This would start a fire.

So what the Orlando Fire Department did was to start an educational campaign using posters that they put in the local grocery stores so that the people that were buying the food, assuming that they were also to be cooking the food, realized that you are not supposed to put a pot on the stove and then walk away from it. That has just started. We have no data as to the success of that program. We certainly hope that it is successful.

Last year the state of Texas took the statewide data and some national statistics and they used it in order to try to adopt some State building codes that would increase the fire safety in buildings in the State of Texas.

At the Federal level we have discovered most recently that the people that are burning up in fires are small children and older people. And, in addition, the very poor.

So we now have some problems that we have been able to identify at all levels.

The U.S. Fire Administration has been slated for zero funding for 1987, which, in itself, is a crying shame in the fire service's opinion.

Without the national fire focus we will not be able to attack the national fire problem. The Fire Administration gives us that focus.

There are many problems that can occur in the local and State environment that, without a national focus, could not be identified as a fire problem.

For example, kerosene heaters. If we had one fire in 500 separate and local departments with a kerosene heater and if that data was not collected at a national level we might not realize that kerosene heaters are a problem.

Now because that data comes to the U.S. Fire Administration and it is compiled and analyzed, we found out that we had a kerosene fire problem, a kerosene heater fire problem.

There are also other agencies that use our data. CPSC has been using our data for several years in its various studies and programs to enhance consumer product safety. There are also many other private organizations.

I have promised Mr. Reiss a list of some of the inquiries that the U.S. Fire Administration gets for data. We will have that ready for him by the end of next week.

Senator GARN. Yes.

RESIDENTIAL FIRE FATALITY STUDIES

Mr. DARRAH. We have also some ongoing projects with the Fire Administration. Presently we are working with the Fire Administration and with a private consultant doing some residential fire fatality studies.

Because of the problem of the very old and the very young and the poor dying in fires, we have identified four locations where more specific data will be gathered. This is data such as the occupation, the living habits. That will have to be gathered at the fire scene itself, maybe even weeks after the fire occurred by talking to neighbors.

Our organization, the National Fire Information Council, will be working with the Fire Administration in gathering that data with the hope that more specific fire prevention programs can be developed out of that information.

Recently, as of last week, we started or got involved with a study with the CPSC on children playing with cigarette lighters. We hope to determine whether or not cigarette lighters need to have to be childproofed.

We also have a data dissemination program where the local fire departments can call a computer in a central location and get national statistics and their own statistics.

One of the most significant things that we are doing at the present time is working with the U.S. Fire Administration on what is known as the Applications Project, which is a microcomputer application for several fire service programs.

One of them is national fire incident reporting. In fact, the state of Utah will be involved in that within the next few weeks. This will allow the local department to not only gather the information at the fire scene, but to enter this on a microcomputer at their headquarters and do some very basic data analysis. This is obviously slated for the small departments, Mr. Chairman.

In closing, I would like to say that we all do realize that this country and our society is an information-based system. Without information, such as the national fire incident reporting system, as it provides, we would not be able to solve our problems that we have in this country, that being the fire problem.

Thank you for your attention.

Senator GARN. Thank you very much.

The national fire incident reporting system certainly serves a very valuable function, as you described.

Mr. DARRAH. Yes.

Senator GARN. Why aren't all 50 States represented, Mr. Darrah?

Mr. DARRAH. One of the advantages of the program and the momentum that it has now is that we have States that are coming on. Nebraska is about ready to come into the system.

Senator GARN. Yes.

Mr. DARRAH. So is Indiana.

There are, unfortunately, some States where the State legislators have not chosen to fund. Georgia used to be in the system. For the lack of about $10,000 they had to drop out of the system. Nevada also used to be in the system. Arizona used to be in the system. Unfortunately, in Arizona, the funds that were lacking were $3,000.

We find that some States don't see the need to collect the data on a statewide level. If the Fire Administration goes away, we are afraid that the focus of the Federal Government will cause, perhaps, some of the others to go away also, Mr. Chairman.

Senator GARN. Another agency that is under this subcommittee's jurisdiction, the CIC that you referred to, charges a dollar user fee for requests of more than one free document. Is it possible to institute some sort of a charge or a user fee to organizations or nonparticipating jurisdictions requesting information?

Mr. DARRAH. Yes; it is. We have been discussing that as of recently. We feel very strongly that the user fee is a very good source for revenue in the future.

Senator GARN. Thank you very much.

[The statement follows:]

STATEMENT OF RONALD G. DARRAH, PRESIDENT, THE NATIONAL FIRE INFORMATION COUNCIL

Chairman Garn and Committee Members:

The National Fire Information Council (NFIC) is the group of Fire Service personnel and other related individuals responsible for the management of the National Fire Incident Reporting System. The reporting system was designed by the U.S. Fire Administration solely for the purpose of collecting data relative to the cause and effect of fire on our great Nation. The National Fire Information Council is made up of 40 state members and 25 metropolitan members. Metropolitan members are cities and/or counties with a population of 500,000 or more. The organization represents the data collection effort of over 11,000 fire departments nationwide.

Fire data is collected at the local level and then passed on to state agencies for further processing. After a state has processed the data it is sent to the National Fire Data Center/U.S. Fire Administration, where the data is compiled to facilitate the ability to accurately analyze our Nation's fire problem.

Over the last decade the Fire Service, working hand in hand with state and federal fire agencies, has made significant progress in the fight against the worst fire record in the industrialized nations. More than 6,000 people have died in the United States during the last year due to fire.

There are many fire programs working throughout the country at this time, many are fully or partially funded by the federal government. Without fire incident reporting and the federal focus provided by the Fire Administration the Fire Service will have little or no quality data to test the validity of those essential programs. It is imperative that we measure the impact we are having on the fire problem. Over the last five years the statistics generated by the National Fire Incident Reporting System have been used effectively to establish the need for increased fire prevention programs and fire education programs, such as "LEARN NOT TO BURN". In addition, the data has assisted local departments in obtaining needed fire equipment, staffing for fire prevention/education programs, and safety equipment for their fire fighting personnel.

Within the past 18 months the National Fire Information Council has been involved in several important programs with the Fire Administration and other federal agencies. Presently, NFIC is working with a private research group and the Fire Administration in an effort to study various causal factors in residential fire fatalities. This research is being conducted in the very heart and grass roots areas of our Nation where the real fire fatality problems exist. Fire statistics prove that the very young and the very old are dying at an alarming rate compared to other age groups. In addition, we find that the majority of fire deaths occur in the lower income groups. The Residential Fire Fatality Study will assist in identifying the appropriate steps necessary to address this unacceptable situation.

NFIC is also involved in assisting the Consumer Product Safety Commission (CPSC) in a special study relative to the problem of children playing with cigarette lighters. We hope to determine if there is a need for child proofing cigarette lighters. Again, without fire statistics developed by the Fire Service, it would be impossible to know where to begin on this type of project.

The data collection and statistical analysis effort relative to the Nation's fire problem has and will continue, with your assistance, to be one of the most cost effective joint ventures between the federal government and state and local agencies. During the last year alone, local and state commitment to this program has been over $6,000,000 in service rendered. The federal government, via the U.S. Fire Administration/National Fire Data Center committment has been in the neighborhood of only $350,000. Dollar for dollar this is proving to be a very beneficial investment of taxpayers' money.

The data collection effort between local and state fire agencies is presently being enhanced by a program completed by the Fire Administration in conjunction with the National Fire Information Council. Soon local fire departments will have the capability to enter fire incident data on microcomputers, this data will be available for the local department to produce on-the-spot statistical reporting for immediate use by Fire Prevention personnel, fire educators, and of course department administrators. The department will also have the capability to send the data to the state level agencies, using a data "uplink" system. This process will greatly enhance the quality and the quantity of the data collected. NFIC has had a major role in the development and distribution of this program.

In closing, let me say that modern managers cannot solve today's problems without quality data to point the way for their problem solving efforts. The National Fire Information Council provides the answers to many questions raised by this Nation's unacceptable fire statistics. Without the federal focus provided by the U.S. Fire Administration, national statistics would not be possible. If that should occur we will see the death rate due to fire climb to an even higher unacceptable level.

STATEMENT OF PETER O. PEDERSON, CHIEF, SALT LAKE CITY, UTAH, FIRE DEPARTMENT

Senator GARN. Next I would like to invite Chief Pederson who is the chief of the Salt Lake City Fire Department to testify. I have got my own fire chief here today.

Chief PEDERSON. Mr. Chairman, I want to take this opportunity for inviting me to testify today on behalf of the International Association of Fire Chiefs. I want to thank you and the other members of this subcommittee for the consistent and unswerving support that you have shown in past years when there have been similar attempts to eliminate the Federal fire programs.

The International Association of Fire Chiefs represents this Nation's chief fire officers. I'm here to speak for those fire chiefs who are charged with managing and administering the fire departments that are our Nation's first line of defense against an endless number of manmade and natural disasters.

In other words, our members are charged with protecting the public. Therefore, I appear before this subcommittee today to defend both Federal programs that help our members to do a more effective job of protecting the public.

I would like to propose a scenario. What do you think would be the reaction if every month one fully-loaded 747 took off from Washington, DC, and another 747 took off from Los Angeles. They collided somewhere over the West killing everyone aboard both airplanes. I am sure that the public outcry would be deafening. Yet, that is approximately how many people we kill in fires every month in this country. The outcry is far from deafening.

The human suffering and the loss of life is tragic. However, the economic loss is staggering. The overall annual loss from arson alone is in excess of $4 billion. From fires in general, the loss is in the tens of billions of dollars, Mr. Chairman.

The point that we will try to make this afternoon is that, with a modest amount of seed money, the $25 million devoted to the Federal fire program, that is, that those programs over the last several years have reversed as a national trend and have caused a decline in the country's human and financial fire loss statistics.

The list of the accomplishments of the Federal fire program fills up more than 10 pages in our written testimony. Obviously, for the sake of time, I will not include that list in my verbal testimony. However, there are a few accomplishments that deserve mention.

ACCOMPLISHMENTS LISTED

One is that since the Fire Administration and the Fire Academy programs have been in operation, the life and property loss from fire in this country has turned downward.

In a 6-year period, deaths are down to 6,000 annually from a high of almost 8,000. We are still one of the leading countries in the world on fire deaths.

As a result of the Fire Administration's public education programs and leadership, smoke detectors have been installed in more than 60 percent of the Nation's homes.

The Fire Administration has developed one of the world's most effective resources for fighting arson. This includes juvenile fire programs, arson early-warning systems, arson information management systems, and development and support for local antiarson activities.

Statistics now show that total incendiary and suspicious structure fires are down 35 percent from a peak in 1977. The civilian deaths in these same fires are down 24 percent from the peak in 1977.

The National Fire Academy is the only Federal training facility with a clear mandate to give hazardous material training at the local level and to emergency response personnel.

In fact, I might point out that, from the Congressional Office of Technology Assessment in a report issued last month, "The most pressing national need in emergency response is finding an effective way to train first responders and how to handle different types of hazardous materials."

STIPEND PROGRAM

In a recent IAFC survey more than half of the public fire departments that responded said that they had received their outside training from the National Fire Academy. Elimination of the Academy student stipends will remove the primary affordable source of hazardous material training that's available to the fire service.

In fact, in another recent poll by the IAFC, this being the large metropolitan fire departments, of which there are approximately 100 in this country, the results show that 75 percent to 100 percent say that there will be a dropoff in the attendance from their departments without the stipend program, and that they will not be able to cover these stipends from their own local budgets.

The Salt Lake City Fire Department alone will be forced to eliminate attendance by over 90 percent.

In referring to one of the questions that you asked here earlier, the cost of sending, that is, a question to one of the earlier gentlemen, that the cost of sending someone to the Academy is not totally borne by the Federal Government. I will use my city as an example. I have a constant manning program. For me to send a firefighter to the Academy my cost from the budget would be about $1,250 per individual. That means that when a person goes to the Academy I have to fill behind him a firefighter.

Our firefighters in Salt Lake City pay their own meal costs. The cost of the stipend program pays for transportation and housing. That is just a small portion of the total cost that is borne by the fire service.

Federal funding for the fire programs is extremely cost-effective. Few Federal programs can boast as many accomplishments with a total budget of less than $25 million. The money that is needed to fund these programs is insignificant as compared to the $312 billion that is recommended for the defense programs in the 1987 fiscal year budget.

In fact, it would cost taxpayers $10 million less to fund all fire programs than to purchase one F–18 fighter aircraft.

We realize the need for a balanced budget and the absolute necessity to reduce our sizable federal deficit. We realize that there will be some changes as a result.

However, we also realize the need to continue the essential downward trend in fire deaths, injuries, and the property loss from fire. It is to have a sound fire prevention program across this country, to educate the fire officers in all of the aspects of fire protection, to continue the fire research programs, to maintain and improve the national fire data system, and to promote to the fullest extent automatic detection, alarm, and suppression systems.

We can accomplish all of these objectives and more by refunding the U.S. Fire Administration, the National Fire Academy, and the Center for Fire Research at their current budget levels, which is a modest annual investment of $25 million. With $25 million, the prospects are good that we can continue the downward trend in the tens of billions of dollars and the loss of life in this country every year.

Thank you, Mr. Chairman.

Senator GARN. Thank you, Chief. It is nice to have you here.

Chief PEDERSON. Thank you, sir.

Senator GARN. I understand as to the snowstorm out there, 38 inches in the mountains, had the ski resort owners had only known that they could have stayed open longer if they knew it was coming.

Getting back to your testimony, I certainly can understand what you are saying about the lack of understanding as to the number of people that die in fires.

Chief PEDERSON. Yes.

"CHALLENGER" TRAGEDY

Senator GARN. It is a very similar situation, Chief, here now that I have been going through as tragic as the loss of seven of my friends with *Challenger*.

As I look at the press coverage, it still continues 3 months later. The sharks are on a feeding frenzy as there is a little blood in the water. They are creating a lot more here as to the attention paid to that.

Don't misunderstand me. No one wants them to find the problem, fix it, and fly again more than I. I have been also criticized for overly defending NASA. It is amazing to me that 6,000 people die in fires.

Chief PEDERSON. Yes.

Senator GARN. We lost seven. They were my friends. We ought to put it into perspective. What about the 45,000 to 50,000 people on the highways. If we could get the press attention, can you imagine how many lives that you would save here and in fires. That is if you had the nightly news, the Washington Post, and all the papers for 3 months talking about the dangers of fires in this country. Without any actual appropriation of money they could save some lives. They won't contribute to saving anything at NASA. They will contribute to a lot of problems and kicking somebody while they are down.

It is the same thing in spending 3 months talking about the danger of drunk divers on the highways. You might even save 5,000 or 10,000 lives a year. But that isn't as much fun. It isn't as sexy as it is to yell and scream the way they have been doing.

I fully understand your remarks and what you are saying.

Chief PEDERSON. Yes.

Senator GARN. I don't know what to do about it except to educate people and bring it to their attention.

Your example of the two 747s, yes, that would get their attention.

Chief PEDERSON. Yes.

Senator GARN. That would get their attention for a while before they found something else to jump on.

We have some continuing problems in this country. Fire is one of them. The automobile deaths are an incredible problem. We seem to take 50,000 people a year for granted and we don't care to do very much about it.

I appreciate your testimony and your work in continuing to try to educate people and prevent what are a lot of preventable incidents.

As you know, I had enough to do with the fire department years ago and with my 7 years in local government where I got a pretty good education during those years.

Thank you very much for your testimony.

Chief PEDERSON. Thank you.

Senator GARN. Chief Pederson, your full statement will be included in the record at this point.

Chief PEDERSON. Thank you.

[The statement follows:]

STATEMENT OF PETER O. PEDERSON, CHIEF, SALT LAKE CITY FIRE DEPARTMENT, ON BEHALF OF THE INTERNATIONAL ASSOCIATION OF FIRE CHIEFS

Mr. Chairman, I want to take this opportunity to thank you for inviting me, as a representative of the International Association of Fire Chiefs, to testify on this matter of vital importance not only to the American fire service, but to the citizens of this country threatened by fire, medical emergencies and other hazards requiring emergency response.

I also want to thank this subcommittee and you, its members, for the consistent and unswerving support that you have shown in past years when there have been similar attempts to almost eliminate the federal fire programs.

Mr. Chairman, members of the subcommittee, the International Association of Fire Chiefs, representing this nation's chief fire officers, is here to speak for those fire chiefs who are charged with managing and administering the fire departments that are the nation's first line of defense against fires, medical emergencies, floods, earthquakes, hazardous materials emergencies, and an endless number of manmade and natural disasters. In other words, our members are charged with protecting the public. Therefore, I appear before this subcommittee today to defend those federal programs that help our members to do a more effective job of protecting the public.

What do you think would be the reaction if, every month, one fully loaded 747 took off from Washington and another took off from Los Angeles, and they collided somewhere over the Midwest, killing everyone aboard both planes. The official and public outcry would be deafening; the attention given this problem would fill newspapers and television screens across the country. Yet, that is approximately how many people we kill in fires every month in this country. And the outcry is far from deafening.

Before this hearing is over, another three people will die in fires because fires kill approximately one person an hour. Unfortunately, most of those killed will be either over 65 or under 10 years of age.

The human suffering and loss from fire is tragic. However, the economic loss is staggering. The overall annual loss from arson alone is in excess of $4-billion. From fires in general, the loss is in the tens of billions of dollars. The point that we will try to make this afternoon is that with a modest amount of seed money -- the $25-million devoted to the federal fire programs -- those programs, over the last several years, have reversed a national trend and have caused a decline in the country's human and financial fire loss statistics.

Since the federal fire programs were started in the mid-1970s, we can register the following successes primarily resulting from stimulus provided by the fire administration and fire academy:

- The fire community worked for more than a decade to convince Congress of the need for a federal focus on fire, particularly fire prevention. The justification for these programs, the U.S. Fire Administration and National Fire Academy, has not changed.

- Since the USFA and NFA programs have been in operation, life and property loss from fire has turned downward. In a six-year period, deaths are down to 6,000 annually from a high of almost 8,000.

- As a result of USFA public education programs and leadership, smoke detectors have been installed in more than 60% of the nation's homes.

- The USFA's National Fire Incident Reporting System was established and now links more than 11,000 fire departments in 39 states. This information exchange network is invaluable both as a gauge of the fire problem and our success in combatting it. It can be managed effectively only at the federal level.

- The USFA has developed one of the world's most effective resources for fighting arson. This includes juvenile firesetter programs, arson early warning systems, an arson information management system and development support for local anti-arson activities. Statistics now show that total incendiary and suspicious structure fires are down 35% from a peak in 1977. Civilian deaths in these same fires are down 24% from the peak in 1977.

- The USFA has taken the lead in developing a number of important fire fighter health and safety programs, including Project FIRES, the purpose of which is to design new state-of-the-art protective clothing for fire fighters. It is important to point out that Project FIRES did not reinvent the wheel, but took proven "spin-off" technology from NASA's space program and adapted it to the fire service. Project FIRES also has involved the private sector in developing materials for the protective clothing.

- The USFA is a much-needed clearinghouse of fire information. It has played a leading role in disseminating information on fire prevention, the use of smoke detectors and sprinkler systems and a five-step planning process for public fire safety education program managers.

- The fire administration has made a special effort to reach out to children -- the frequent victims of deadly fires. In fact, children under five account for 17% of all fire deaths. This effort has included the successful production of the Sesame Street pre-school fire awareness program.

- The National Fire Academy serves as an advanced training facility for the American fire service at all levels of government. The academy has played a major role in standardizing the use of proven fire protection programs and grooming the professional men and women called upon to use them.

- Recent years have seen a marked increase in public concern over toxic chemical accidents. In communities across the country, it is nearly always the fire service that must respond when these incidents occur. The National Fire Academy is the ONLY federal training facility with a clear mandate to give hazardous materials training to local-level emergency response personnel. In a recent IAFC survey, more than half of the public fire departments that responded said that they received their outside training from the National Fire Academy. Elimination of the academy's student stipends will eliminate the primary affordable source of hazardous materials training available to the fire service. It also will mean that the emergency response personnel expected to handle hazardous materials accidents (i.e., protect the public) will not have anywhere to get this vital training.

- Federal funding for fire prevention programs is extremely cost-effective. Few federal programs can boast as many accomplishments with a total budget of less than $25-million a year (USFA - $7.364-million; NFA - $11.691-million; and CFR - $5.81-million. Total - $24.856-million).

- The $25-million needed to fund federal fire programs is insignificant compared to the $312-billion requested for defense programs in the fiscal 1987 budget. In fact, it would cost the taxpayers $10-million less to fund all federal fire programs than to purchase one F-18 fighter aircraft.

Although I realize it is the subject of another hearing, before closing I want to say a word in defense of the Center for Fire Research at the National Bureau of Standards. The center is an internationally respected scientific research facility. The elimination of the center would destroy the only federal scientific body that has aggressively researched and analyzed the chemistry and physics of fire. This pioneering effort has led to a fundamental understanding of the nature of combustion and the development of fire-resistant materials and building techniques.

It is also worth pointing out that the Center for Fire Research was primarily responsible for developing the technology that lead to the smoke detector and the quick response sprinkler...two technologies that the fire administration is using to promote improved fire safety across the country. This is a good example of the flow of technology and information from the center to the fire administration to the public.

Finally, elimination of the Center for Fire Research would leave the United States as the only industrialized nation without a central, federal fire research facility....an embarassment in light of the fact that the U.S. has one of the highest fire death rates of any of the industrialized nations.

We realize the need for a balanced federal budget and the absolute necessity to reduce our sizable federal deficits...and we realize that there will be some changes as a result. However, we also realize the need:

- to continue the essential downward trend in fire deaths and injuries;
- to continue the reduction in property loss from fire;
- to have a sound fire prevention education program across the country;
- to educate fire officers in ALL aspects of fire protection;
- to continue fire research programs;
- to maintain and improve the national fire data system; and
- to promote to the fullest extent automatic detection, alarm and suppression systems.

We can accomplish all of these objectives and more by refunding the U.S. Fire Administration, National Fire Academy and Center for Fire Research at their current budget levels ...a modest annual investment of $25-million....$10-million less than the cost of one F-18 jet fighter. Twenty-five million dollars...and the prospects are good we can continue the downward trend in the tens of billions of dollars we lose in this country every year from fire.

How can we measure the value to our society of those who are still alive because of these programs. Statistically, it is likely that somebody in this room or a family member of someone in this room right now might number among the almost 10,000 lives saved over the last five years. Funding for the programs is more than dollars. It is a statement and commitment on the part of the whole country that fire is a problem with which we must deal.

I have attached a detailed list of the U.S. Fire Administration's major accomplishments from fiscal year 1983 through fiscal year 1985. If you have no objection, I would like to have that list included as a part of the official record.

Thank you for this opportunity to testify.

U.S. FIRE ADMINISTRATION

MAJOR ACCOMPLISHMENTS: FY 83-85

Reorganization Matters

- Completed transition to NETC/TFPD (FY 83-84)
  - New organizational plan approved by Director
  - Consolidated in new offices in "N" Building
  - Recruited staff for 20 FTE
- Established new working relationships with National Fire Academy and Emergency Management Institute (FY 83-84)
- Developed new program priorities in consultation with Joint Council of Fire Service Organizations (FY 83)
- Completed several carry-over FY 82 projects (FY 83)
- Completed 100% funding of program plan despite transition period (FY 83)

Program Accomplishments

	Estimated Funds Expended
I. Policy and Coordination (Fire & Rescue Service Mgmt)	
o New Program Planning Initiated planning for several new programs, i.e. National Community Volunteer Fire Prevention, national residential sprinkler, and private sector participation programs. (FY 83-85)	175 k
o Integrated Emergency Management Developed and funded with support from FEMA/SLPS a major Integrated Emergency Management System (IEMS) project with the International Association of Fire Chiefs (IAFC). This effort, started in FY 83, has developed and promoted improvements in emergency management planning and operations from the fire and public safety perspective. Promoted and monitored by a national advisory committee, this project has produced many important products including 15 regional IEMS workshops; varieties of information through a clearinghouse, Fire Chief Magazine, and other publications; a planning guide for community leaders; and an IEMS workshop kit; and also provides analysis and input into SLPS programs in data collection and use, continuity of government and emergency support services. (FY 83-85)	300 k
o Fire Executive Fellowship Program Established the FEMA Fire Executive Fellowship Program at Harvard University in cooperation with the JFK School of Government and the National Fire Academy (NFA). A national competition is used to select senior fire	

executives to attend a three-week program at Harvard. Sixteen Fellows have been selected over three years. This program is now incorporated into the master curriculum of the NFA.

(FY 83-85) 125 k

- National Leadership Conferences

  With support from the National Fire Academy, carried out several national leadership conferences. One, the "Partnerships Against Fire" attracts fire officials, educators, community groups and others. Another conference brought the 50 State Fire Marshals together in cooperation with the Fire Marshals Association to focus on the unique and changing issues facing states.

  (FY 83-85) 275 k

- Volunteer Fire Service Communications

  In cooperation with the National Volunteer Fire Council, supported effort to improve information network among nation's volunteers. Also supported Stonebridge planning conference with NFA.

  (FY 83-85) 60 k

- Consensus Codes Program

  In fulfillment of mandates of PL 93-498, supported the ongoing consensus codes process of the National Fire Protection Association (NFPA). The promulgation and adoption of improved codes will lead directly to a further decline of the loss of life and property due to fire.

  (FY 83-85) 875 k

- Alternative Fire Service Methods & Management

  Assessment of the various methods that local governments are using to provide fire protection and other fire prevention. Information shared with state and local fire services including manuals, other publications and materials.

  (FY 83-85) 60 k

- FEMA Regional Support

  Provision of funds to Regions to support regional fire information centers.

  (FY 83-85) 45 k

- Basic Fire Research (CFR)

  Reinstituted joint research projects with NBS/Center for Fire Research (CFR) supported by USFA funds. These projects involve basic testing, modeling and analysis on subjects such as smoke detectors, extension of use of residential sprinkler technology, fire safety, trade-offs and cost/benefit analysis of firefighting protective equipment.

  (FY 85) 300 k

o Fire Safe Cigarette Research (CPSC)

USFA Administrator appointed as Vice-Chair of Interagency Committee established by Cigarette Safety Act of 1984. Technical Advisory Committee (15) representing public health, fire safety, furniture and tobacco industries oversees the research activities of this program.

(FY 85) 150 k

II. Firefighter Health and Safety

o Project FIRES (Firefighters Integrated Response Equipment System)

During the past three years, the Fire Administration has been involved in a program to improve the design and performance of structural firefighters protective clothing and equipment. This project has produced and field tested three versions of prototypes aimed at lowering the metabolic load of firefighting without sacrificing protection. Prototypes have been field tested in 14 cities. The next version of NFPA 1971 (standard on protective clothing for structural firefighting) will reflect the research findings of project FIRES.

(FY 83-85) 370 k

o Firefighting Equipment

The United States Fire Administration has been active in the development and testing of tools and equipment for firefighting. Two of the units which are being developed are a short-range radio for fireground communication and an oxyen rebreather breathing apparatus for special incidents. These units have reached the prototype stage and are currently in field testing.

(FY 83-85) 300 k

o Standards Making Activities

The U.S. Fire Administration has been active on the committees that set standards for sprinkler systems and for firefighter proteciton. This has included work with the National Fire Protection Association and the American Society for Testing and Materials.

(FY 83-85) 2 k

o Stress Management and Model Program for Firefighter Physical Fitness

Developed the framework for a program to address both firefighter physical fitness and stress management. The physical fitness program will be for firefighters who require extensive work to pass the initial physical fitness performance examination. The stress management effort is for reducing stress affecting the fire service in today's environment.

(FY 85) 210 k

- Apprenticeship Program

  In cooperation with the International Association of Fire Chiefs (IAFF), the USFA has supported the program to develop, promote and implement apprenticeship training for firefighters and emergency medical technicians. This program serves to standardize the training received by departments throughout the country.

  (FY 83-85) 1.5 Mil

- Northwest Firefighter Mortality Study

  The University of Washington Harborview Medical Center is conducting a mortality study of firefighters in the City of Seattle, Washington. This study looks at all causes of deaths that may be associated with changes in fire smoke exposure in recent decades.

  (FY 85) 82 k

- Smoke Detector Effectiveness

  Single station smoke detectors have been in general usage for ten years. To determine smoke detectors long-term effectiveness, the USFA conducted a study of public education, proper installation, maintenance, and reliability of smoke detector components.

  (FY 83) 30 k

- Smoke Inhalation Study

  The USFA has contracted with the American College of Emergency Physicians to develop a diagnosis and treatment protocol for victims of smoke inhalation. This project is nearing completion (June 1986) and the results will be disseminated to the medical community.

  (FY 83) 76 k

- Fire Department Safety Officer's Reference Guide

  The Fire Administration funded the Fire Department Safety Officer's Reference Guide. The work was performed by the National Fire Protection Association (NFPA) and it will be made available through (published by) the NFPA.

  (FY 83-85) 29 k

- Protective Clothing

  The Fire Administration is actively working with the American Society for Testing and Materials (ASTM) F-23 Committee on Protective Clothing to develop standards for chemical protective clothing for use by the fire service. This is a continuing 1984 initiative and complements USFA's participation on the newly formed National Fire Protection Association (NFPA) 1971 Subcommittee on Hazardous Materials Protective Clothing.

  (FY 85)

III. Fire Prevention and Arson Control

Community-Based Anti-Arson Program

Developed and funded through competitive grants to various community organizations. Over 30 grants provided to create neighborhood based anti-arson programs to mitigate arson related fires.

(FY 84-85) 570 k

Community Volunteer Fire Prevention

Congressionally mandated effort to increase the scope and effectiveness of local fire prevention through a merger of federal, state and local resources with the private sector to support new community prevention, education and protection programs. Grants awarded to States (20 and DC to date) who in turn fund local projects (61 projects currently).

(FY 84-85) 3 Mil

Residential Sprinkler Program

Application of quick response sprinkler technology offers a means to dramatically reduce loss of life and destruction to property. Since 1974, USFA has spent considerable resources to develop quick response sprinkler heads. With a significant increase in funds from Congress in FY 85, the USFA has been able to extend the application of this technology through additional research, demonstration and information dissemination. Examples are:

- Research: unique occupancies, cost-benefit analysis, and local fire tests (San Francisco, CA and Lisle, IL)
- Demonstrations: Regional and local fire demonstrations, retrofit demonstrations in high risk occupancies and continuation of retrofitted mobile trailers (20).
- Info dissemination and technical assistance: Local documentation and publication, printed materials, "Ounce of Prevention," Regional workshops, national conference, and technical assistance (Operation Life Safety).

(FY 83-85) 2 Mil

Juvenile Firesetter Program

Sesame Street and the Childrens Television Workshop, in conjunction with other youth projects, has resulted in development of guides for juvenile counseling to be used by local fire services and schools as well as by the NFA in its field programs.

(FY 83-85) 300 k

- Arson Information Management System

  Designed to run on the various microcomputers used by the fire service today, the USFA has developed and refined this technical program for case management use at the local level to identify potential arson.

  (FY 83-85) 130 k

- Arson Research and Development

  A variety of efforts are supported by USFA to identify and mitigate the worst effects of arson. These R&D efforts include the study of rural arson, support of the federal arson task force, and development of a model urban arson strike force.

  (FY 83-85) 150 k

- Arson Education and Resource Projects

  Continued support of the Arson Resource Center, housed at the Learning Resource Center/NETC; information provision through the ABA, and the production of several arson and education directives provides the USFA with several methods for continuing to provide information to the fire services and related groups.

  (FY 83-85) 200 k

- Teleconferences

  In conjunction with FEMA, USFA has funded and provided program management for a number of national teleconferences in arson, residential sprinklers and hazardous materials.

  (FY 84-85) 200 k

- Codes Administration Project

  Developed and funded project to produce a computer-assisted, reality-based codes training program for local administrators and fire service officials.

  (FY 83-85) 100 k

- Public Education and Awareness

  Responding to Congressional interest in expanded public education and awareness, USFA is carrying out a broad-based program in support of all USFA programs. In addition, targeted education programs are being carried out starting with two efforts aimed at smoke detector maintenance and community volunteer fire prevention activities.

  (FY 85) 1.1 Mil

IV. Fire Data and Analysis

- National Fire Incident Reporting System (NFIRS)

  With the cooperation and support from the National Fire Information Council (NFIC), the USFA operates the NFIRS program. Program collects accurate fire data from throughout the U.S. with 38 states and 20 metro areas reporting on a voluntary basis.

  (FY 83-85) 800 k

- Data Analysis Support

  Manage a comprehensive program of data collection and analyses on issues and incidents relating to fire in response to requirement of P.L. 93-498. Publications and reports, such as Fire in the U.S., are disseminated to interested groups and the public at large.

  (FY 83-85) 600 k

- Management Applications Project

  Improvement of both long- and short-range planning and tactical decisions of fire executives through the development, testing and adoption of automated management information systems. Pilot sites (Arlington, VA; Prince William County, VA; and Southfield, Michigan) are testing the data systems and additional sites will replicate the data packages. Flexible and adoptable automated data systems will be available to other fire departments.

  (FY 83-85) 800 k

- Major Fires Analysis

  In conjunction with support from the NBS/ Center for Fire Research, the USFA investigates and analyzes selected fires of special significance. Reports are developed for publication by national fire journals and for use by NFA in resident program.

  (FY 83-85) 300 k

- Special Studies and Reports

  Completion of special studies and reports on current issues facing the fire and rescue service. Examples are a lecture video series with NFPA, alternate heating studies, State-by-State analysis for Community Volunteer Program, firefighter health and injury surveys, public service announcements, and others.

  (FY 83-85) 425 k

CONCLUSION OF HEARINGS

Senator Garn. That concludes the hearings. The subcommittee will recess and reconvene at the call of the Chair.

[Whereupon, at 4:57 p.m. Wednesday, April 30, the hearings were concluded and the subcommittee was recessed to reconvene at the call of the Chair.]

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